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LECTURES

ON

COMPARATIVE ANATOMY AND ANIMAL PHYSIOLOGY,

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BY

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LECTURE II.

ON THE OBJECTS OF COMPARATIVE ANATOMY, AND ITS APPLICATIONS TO OTHER BRANCHES OF KNOWLEDGE.

GENTLEMEN,—Having now given you a general outline of the rise and progress of this department of knowledge, I propose, during the present hour, to direct your attention to some of the more immediate objects and applications of comparative anatomy. These I shall illustrate by the specimens which are now before us.

The object of this study is to make us acquainted with the internal mechanism of all kinds of animals. Nothing can be more gratifying to a curious and inquisitive mind, than to become acquainted with the internal structure of those beings, with the forms and movements of which we are so conversant, and are forced to become so familiar by continual observation. The mind, indeed, is involuntarily excited to this inquiry, by a natural desire to discover the causes of all the phenomena of nature. We do not rest satisfied with contemplating the movements of the various animals, but feel instinctively impelled to trace the connexion which may be discovered to exist between those movements and the internal structure.

When we examine the internal mechanism of animals throughout the whole of the divisions of a class, we are struck with the similarity of the general plan upon which they have been constructed in all their apparatus for self-preservation, and the continuance of the race. By comparing the organization of one class with that of another belonging to the same great subkingdom, we perceive only slight modifications of the same plan; and by continuing the comparisons, and extending them through all the great divisions of the animal kingdom, from the highest to the lowest, we observe the gradual disappearance of whole systems of organs, but in those which remain we distinctly perceive the rudiments of the same plan of formation.

The osseous system, particularly in the lower forms of animals, is remarkable for its inconstancy and its variety. The muscular and the nervous systems are nearly simultaneous in their origin, and in the march of their development in the great body of the animal kingdom. The vascular and the respiratory systems are gradually simplified and lost as we descend, and the digestive organs are those which can be traced through all varieties of animal existence. The beautiful investigations and discoveries of modern botanists have shown a like simplicity and unity of plan to pervade the vegetable kingdom, and have pointed out a striking similarity in the phenomena presented by both kingdoms of organised bodies during the earlier stages of their development. So that we begin to discover the operation of the same simple and uniform laws throughout all organised nature, from the first development of the lowest vegetable form to the lord of the creation.

In studying the organs of support, or the skeletons of the various forms of animals, we not only examine the composition of the various earthy substances which tend to form the solid framework of the body, which gives support, form, and protection, to the general mass, and to all the soft parts, but we examine the analogies which exist between the differ-

ent conditions of the skeleton in the various classes of inferior animals, and the conditions presented by that system in our own body during the successive stages of its development. The same earthy materials are not employed to consolidate the skeleton in all forms of animals. In the lowest tribes of animals, we observe the same earths employed to give form and stability to the mass which are so abundantly secreted by the vegetable kingdom—silica and lime. Innumerable animals which secrete no earthy matter, exude an adhesive albuminous substance from their surface, which, by agglutinating extraneous particles, forms tubes to protect their body. Those spongy poriferous animals which appear so soft and downy, and hold almost a doubtful place between the vegetable and the animal kingdoms, have their skeleton consolidated neither by the phosphate, the carbonate, nor the oxalate of lime, but by the hardest and least soluble, though the most abundant of earths, silica. Their skeleton, like the embryo condition of the skeleton in the highest animals and man himself, is composed of extremely minute detached spicula diffused through a firmer cartilaginous tissue which permeates all parts of the body. These spicula, which are here siliceous, serve, by their grouping into fasciculi, and these fasciculi into continuous filaments, to give form to all the internal passages, and the whole outward form of the body. Some of these animals, however, we shall find have their skeleton composed of minute detached spicula of the carbonate of lime, and others spicula of a horny texture. Those of the carbonate of lime occur also abundantly diffused through the fleshy substance of zoophytes or polypipherous animals, as in the fleshy crust of this gorgonia, and in the substance of this lobularia. But the great mass of the skeleton in these various forms of corals, and in the radiated classes of animals generally, is composed of the carbonate of lime, with a small portion of the phosphate. The phosphate, however, occurs in larger proportion in the articulated classes than in the radiated, though accompanied with the same carbonate. In insects, indeed, we find the woody substance termed by the French chemists *chitine*, which composes nearly the whole mass of their elytra, and of the rings and tubular sheaths which encompass their soft parts, to be consolidated only by the phosphate of lime, thus presenting another affinity to the vertebrated classes of animals. In the massive exterior, testaceous permanent coverings of the molluscous classes of animals, and in the more delicate internal laminæ which sometimes protect their most important viscera, we discover only the carbonate of lime, the same earth which we find so extensively spread over the surface of this planet, forming whole chains of mountains in the form of limestone. So that, without founding any speculations on the fact, we find the lowest forms of animals busied in precipitating by their vital powers, to form their solid framework, principally silica and carbonate of lime, which are common ingredients in the solid crust of the earth.

As we rise, however, through the vertebrated animals to man, we find the phosphate of lime to increase in quantity, as a consolidating material of the skeleton. It is curious to observe the different conditions presented by this internal articulated skeleton, which is so characteristic of that great division of the animal kingdom to which man belongs. We observe that in the lowest fishes the skeleton is of a soft, transparent, cartilaginous texture; that in that class it gradually becomes more and more consolidated by the deposition of the phosphate of lime, in fibres or spicula, which is greater in proportion in the osseous fishes; that its quantity is still greater in the amphibia, and greater again in the reptiles. It is in very large proportion in the dense skeletons (though light and compact in their texture) of birds: and in the massive skeleton of quadrupeds it enters as a very abundant ingredient.

It is interesting to the student of anatomy to trace the resemblance which can thus be seen between these conditions of the skeleton, as prominent forms, and the conditions of the human skeleton, becoming gradually consolidated from the fœtal state upwards, to the adult condition. It is, as you all know, at first a homogeneous, soft, gelatinous mass. As it becomes consolidated, this gelatinous mass assumes a firmer texture. Phosphate of lime becomes deposited in its interior at fixed and determinate points, constituting the centres of ossification.

Now these centres of ossification constitute, with the comparative anatomist, for the most part so many distinct bones or elements of the skeleton, which in the cold-blooded classes never unite. This is important to the comparative anatomist in deciphering the complex structure of the heads of fishes and of reptiles, where the centres of ossification seldom unite. The young anatomist, directing his attention to the osteology of the head of the cold-blooded classes of animals, would be perplexed by the multiplicity of bones which present themselves, were he not aware that there is a remarkable correspondence between the separate bones which compose the heads of those cold-blooded ani-

mals and the centres of ossification of the head in the hot-blooded classes and in man, and thus we perceive the plan is everywhere the same.

When, however, we consider the skeletons of animals in another point of view in relation to the remains which are found in the interior of the earth (the only remnants left us of vast tribes of beings that once existed on the surface of the earth), we find that the study of the recent animals is of great importance as a key to the deciphering of those remains. By becoming acquainted with the changes which the shells of the molluscous animals, as of the cypræa, the pterocera, strombus, and many others, undergo during their development, we see that forms the most dissimilar have yet belonged to the same animal, and that this diversity of form is produced by certain changes which take place at their free margins in the adult state. And were the geologist or the conchologist not aware of those changes, he might be induced to consider those various forms of the coverings of the same molluscous animals, as not only belonging to different species, but even to entirely different genera, of animals.

In considering the important theories which are founded by the geologist on the identity of fossil remains in strata of different eras or of remote latitudes, we find the importance of attending to these minutiæ of the skeleton. Comparative anatomy and geology owe much to the researches of our countrymen into the remains of the reptiles which are found in the older secondary rocks. The investigations of those individuals have pointed out not only forms with which we were previously entirely unacquainted,—forms which present combinations of organs no longer found united in any existing race of animals, but they have pointed out many connecting links which appear to be wanting in the chain of existing beings. We are all familiar with the interesting facts which have been discovered regarding the ancient zoology of Europe, and particularly of our own country. By carefully investigating the bones found in diluvial caves, it has been shown that numerous large quadrupeds, now confined to warmer parts of the globe, abounded in the forests of our own latitudes.

A more careful study of comparative osteology has corrected many of the erroneous views entertained by the older naturalists. The bones of the elephant have been mistaken for those of antediluvian giants. The ribs of large tortoises, with their serrated sutures, have been mistaken for fragments of enormous human skulls, and even the vertebral column of an extinct salamander has been ascribed to a giant of our species.

There is a reason for every variety in the form and position of the skeleton of animals. It is generally placed as a solid shield on the surface of invertebrated animals from the imperfect development of their nervous system, and their organs of the senses. From the imperfect development of these, they are unable to protect themselves by means of the delicate organs of relation, which are so highly developed in the more elevated forms of the vertebrated animals. The exterior shells constitute a shield by which they are protected from external injuries, and are enabled to fulfil the purpose, for a limited time, for which they were formed. They are without that high development of the intellectual organs, and of the organs of the senses, which form the protection of the vertebrated classes. The high development of the brain, of the spino-cerebral axis, of the nervous system, of the organs of the senses, and of the skin, in the highest forms of the vertebrated classes, form so intimate a connexion between them and surrounding nature, that they are made aware of dangers before they approach. Their solid framework is, therefore, enclosed within the body, and the softer organs which move it are placed on the exterior. Their shield does not consist of shells to cover them like the inferior tribes, but of those delicate organs by which their relations are rendered so intimate with surrounding nature.

When we examine the skeleton of the lowest forms of the vertebrated animals, we see that the texture is of a coarse and fibrous structure; that the fibres are more and more separated as we descend in the vertebrated classes, that the fibrous texture is thus visible and coarse in fishes, in reptiles, and even in the lowest of the mammalia—the cetaceous animals; that, as we ascend, the texture becomes more and more compact, more dense, the fibres more nearly approximated, the texture more compact and homogeneous. This is dependent chiefly upon the extent of respiration, the higher degree of development, and the higher degree of temperature of the body.

It is beautiful to observe the perfect adaptation of the forms of the skeleton, and of its condition, to the particular circumstances of each tribe of animals. In fishes it consists chiefly of an elastic vertebral column to strike the dense medium in which they swim. In serpents, it consists of a chain of small but strong bones, to give mobility and strength for their creeping and leaping movements. It forms a strong arched covering in the tor-

toise, exposed to the trampling of the large herbivorous quadrupeds, and a flat covering in the turtle, to cut more easily the liquid element in which it resides. Its general form in the existing and extinct loricated saurian reptiles, the tadpoles of amphibia, and the cetaceous mammalia, which, like fishes, inhabit a liquid element, is singularly approximated to that of fishes without deviating from the fundamental plans peculiar to each of these classes. Indeed the plan of the structure of every part is preserved with remarkable constancy amidst all the varieties of its outward form. We easily recognise the elements of the human hand in the solid foot of the zebra, the pillars of the elephant, the burrowing instrument of the mole, the wing of the bat or the bird, and in the fin of the whale, the turtle, or the fish.

The fibrous texture of the skeleton which is so loose in fishes and reptiles, and in the gigantic cetacea, and in the early condition of the skeleton of man, and of the animals which come nearest to him, arrives at its maximum of density in the class of birds, where the bones are air-tubes communicating with the lungs, and serve, during their rapid descent upon their prey, as condensing syringes for the atmospheric air, with which their bodies are filled like a balloon. This great development of the respiratory system extends not merely through the lungs, but through the cells of the abdomen, through the cells in the surface of the trunk, in the neck, under the axilla, and even into the cavities of the bones, so that the blood of their systemic vessels is aerated by the atmosphere as well as the blood of their pulmonary arteries. This is an important part of the organization of that class, and it is beautifully connected with all their living habits and functions. It develops their hair to feathers for motion. It gives a high temperature to their blood, which is necessary for incubating the egg. It gives vigour of contraction to their muscular system, which enables them to remain long upon the wing, to repeat often the most violent muscular exertions, to pass over vast tracks of the globe, over mountains, and kingdoms, and the ocean. This they are forced to do in quest of food, and from the changes of the seasons. So, when we examine the peculiarities of the skeleton in every other tribe of animals, we find that those peculiarities have an immediate relation to the circumstances in which those animals are placed by nature.

The study of the organs of connexion in animals by which the parts of the skeleton, when it is composed of several pieces, are held together, is not without interest. We there perceive that the ligaments which in the highest forms of animals serve to connect the bones together, to limit the extent, and direct the motions of parts, serve in the lowest forms of animals, not only this purpose, but by their property of elasticity they contribute to the motions of respiration and of the body. In the conchipherous animals those organs serve to open the valves, and thus permit the water to enter for respiration, or impel the animal backwards.

The study of the muscular apparatus of animals, the active organs by which they are moved to and fro on the earth, and by which every internal and external movement of their body is effected, is not less interesting to the anatomist and physiologist, than it is to the natural philosopher, the statuary, and the painter. An acquaintance with this system affords a key to the most striking and apparently inexplicable phenomena and living habits of animals—as the flight of insects, reptiles, birds, and many quadrupeds, and even fishes through the liquid air; the feats of strength displayed by many animals in bounding over the surface of the earth; or the immense velocity with which many marine animals plough the dense abyss through which they move. The statuary and the painter, and all who study philosophically the true characters of living animals, and the shades and varieties of expression presented by animated nature, must be interested in all that relates to their muscular system, or those active organs by which all the motions of the body are effected. Indeed, without an acquaintance with the organs that are called into play in the various motions of the body, neither the painter nor the statuary can give animation, life, or vigour of expression, to his representations of living nature.

It is, we observe, illustrated in many of the productions of the fine arts, where the artist has been restrained in his representations by his want of knowledge of the muscular system, which would be called into action in the violent motions of the animals represented. Some are forced to keep the mouths of animals closed from their being unable to represent, not only the form of the teeth, but the muscles which would be called into action in representing them in a state of nature. The posture of the body has not that play of lively motion which we observe in the various tribes of animals, because the slightest motion of a member, or the representation of any living action, would force the artist to display an acquaintance with the general disposition of the muscles, and with the particular muscles which

are called into action in each motion of the body.

To the natural philosopher the study of the complex machinery by which all animal motions are effected, is replete with the most interesting problems. Borelli, Mayo, and Barthez, by examining the forms of the articulations of animals, and the size and attachments of the muscles, submitted to mathematical calculation the various motions they perform, and the forces they exert in standing, walking, running, leaping, flying, and swimming.

To the physiologist who studies human structure with a philosophic spirit, it is interesting to trace the various conditions, the forms, and the development of the muscular system in the inferior tribes of animals. We observe it at first in the form of a homogeneous pulp before it assumes the form of a fibrous mass. We observe those fibres assuming more and more definite forms until we arrive at that series of distinct fasciculi, which, from their constancy, regularity, and symmetry, in the highest forms of animals, have received distinct names. The muscular system is exactly proportioned in the various tribes of animals, in its development, to the living habits of those animals. If an animal is to fly through the air by the motion of its arms, we find that the muscles destined for the motions, particularly of the humerus, are largely developed. If it is destined to burrow in the earth, the muscles which are destined to move the hands are vigorous; and the whole of the anterior extremities, to give them greater vigour, are shortened. They are thus extended in the bats and the birds, but are shortened in the moles and other burrowing quadrupeds.

It is interesting to trace the gradual development of the nervous system in the animal kingdom,—to watch the first formation of nervous fibres from the state of globules in which that system appears to be in its lowest condition,—to observe the parts which are developed in the course of those filaments of globules, or those nervous fibres,—to trace the connexion between the gradual development of the nervous system, and the general complexness of the whole of the rest of the organization.

We shall never find the nervous system highly developed while the rest of the organization is in the lowest condition of simplicity; but the development of this important system is more an index of the general development of animals than any other system of their economy. We shall trace the gradual development of the spino-cerebral axis in the vertebrated classes, from its simple condition in the petromyzon, and others of the lowest cartilaginous fishes. We shall see that we gradually arrive even at this simple condition of the nervous system in fishes, by tracing it through the radiated animals, where it is disposed in the form of a circular filament. We shall trace it through the articulated class of animals, where, from the lengthened form of the bodies of those animals, it assumes the form of two lengthened cords connected before and behind. We shall trace those abdominal filaments gradually developing ganglia in their course, and the concentration of those ganglia at those parts of the body from which important organs are to be developed.

Thus we shall find in the highest of the articulated animals, that the two simple nervous filaments of the entozoa, have ganglia developed upon them, at first disposed at regular distances along their whole course, and that those ganglia gradually advance, approximate, and unite, at that part of the body from which the extremities of the body are developed; that the ganglia placed above the œsophagus—the supra-œsophageal ganglia, or the so-named brain of those animals, become largely developed in them, corresponding with the high development of the organs of the senses, as the compound eyes, the numerous antennæ and palpi. We shall observe this concentrated form of the great centres of the nervous system more marked in the molluscous classes, where it is concentrated generally in the form of a chain of ganglia around the œsophagus.

In the vertebrated classes, the various stages of the development of the nervous system are intimately connected with the condition of the rest of their organization, and with the kind of relations which they require to have established with surrounding nature. The great centres of the nervous system, the brain and the cerebellum in the class of fishes, correspond with the embryo condition of that system in the human body. The corpora quadrigemina, for example, in the cold-blooded vertebrated classes, remain as undivided lobes, containing cavities within them, as in the embryo state of our own corpora quadrigemina. The hemispheres of the brain gradually become developed in every direction,—upwards, laterally, backwards,—from the class of fishes through the amphibia, the reptiles, the birds, and the quadrupeds, till they acquire that extraordinary development which you observe in man and in the animals which come nearest to him—a development by which the cranial vertebræ are dilated, so as to change entirely their appearance, and to render it difficult at first to trace the analogy which exists between those expanded

cranial vertebræ, and the vertebræ composing the rest of the column.

It is interesting to trace the gradual development of the organs of the senses; to watch the successive additions of parts, from the simplest form of those organs till we arrive at their most complex form in the highest animals; to find the ear of the crustaceous animals consist of a simple vestibule, the internal solid parts added in the cephalopoda, the semicircular canals added in fishes, the gradual development of the cochlea, and the tympanum as we ascend through the cold-blooded animals, and to trace the gradual elaboration in all those internal parts, as well as the addition and perfection of the external concha. And so of all the other organs of the senses.

The study of the digestive apparatus of animals will occupy a considerable time, because it is a system which will lead us to the lowest forms of known animals. We shall see the digestive apparatus from a simple sac without appendices, and with only one orifice, becoming gradually more lengthened and complex in its structure, and developing from its parietes the various glandular apparatus which are to assist in the digestion of the food. We shall see that all glandular organs, whatever be the nature of the secretion they are to form, are tubes developed from the internal or from the external surface of the body. That the intestine develops the pancreas and the liver, and the other glands that open into it; that the surface of the skin develops glands which open upon its surface; that, in fact, all the systems that enter into the composition of animal bodies are successively developed from a primitive, simple, homogeneous, cellular tissue which at first composed the whole body.

The gelatinous embryo of animals, like the albuminous vesicle of the ovum of a plant, or like the simplest animalcule, is at first composed of mere cellular tissue, which, becoming condensed on the surface, forms the integument or skin. The skin, by folding inwardly, forms a stomach, or by passing through the body forms an intestinal canal. The intestine, by lateral prolongations, forms cæca, glands, or vessels, which by becoming developed and isolated, form various independent systems in the higher animals. Prolongations from the skin form cilia or brachiæ, or when they are directed inwardly, they form lungs for respiration; and even the organs of generation have a similar origin from the external or the internal surface, as all glandular organs.

We shall trace the gradual development of the chyliferous vessels, from their simplest form in fishes, as a distinct system, gradually acquiring valves and glands in their course, and the change of the materials which they convey to the blood, from the limpid contents in the cold-blooded animals, to the milky contents in the mammalia.

We shall find that the vascular system proceeds regularly in the march of its development, as we rise from the simple vessels of the polygastric animalcules, and from the lowest articulated classes upwards, through the insects where the dorsal vessel is formed, through the crustaceous animals where a distinct muscular cavity is formed, through the molluscous classes where an auricle is superadded, through the reptiles where two auricles are formed and the ventricle has become partially divided, to the hot-blooded animals where four distinct cavities of the heart exist. There is a beautiful analogy betwixt the various conditions thus presented by the vascular system in the different grades of animals, and the conditions which it is known to present during its development in the embryo and in the fœtus of man. In the highest forms of hot-blooded animals, the vascular system consists at first solely of vessels, and those vessels contain, as in the lowest animals, a colourless fluid. These vessels form an aorta, which develops a ventricle, then an auricle; to this is superadded another auricle and another ventricle by the division of the two original cavities. So that we pass through the same stages of development by tracing this vascular system through one of the highest animals, as we do in tracing it through the great body of the animal kingdom.

It is interesting to observe the forms assumed by the respiratory organs in the various tribes of animals, with relation to the media in which they live. At first the respiratory system is distributed generally over the surface of the body. In proportion to the development of the vascular system and the general organization, the respiratory system becomes limited to a particular part of the body, through which the circulating fluids may be conveniently conveyed in their course through the body. We shall see the first form of the system to consist of cilia, or minute vibratile filaments disposed over the surface; whilst in the aquatic animals, it consists of gills, which are variously disposed, according to the organization and general form of the body. We shall trace the gradual development of those internal respiratory organs, by which the reptiles, the birds, and the mammalia, are allowed so extensive a surface for the distribution

of their blood. We shall observe those cavities gradually developed from the tracheæ ramified through all parts of the insect, becoming more defined in the arachnida,—forming a pulmonary sac in many of the gasteropodes—forming air-bags in fishes communicating with the alimentary canal, and at length with the mouth in fishes and amphibia. We shall observe those sacs becoming more and more complex by the formation of internal septa, till we arrive at the complex organs we see in the hot-blooded vertebrata. We shall trace the connexion which exists between the development of the respiratory system and the muscular system, the correspondence with the development of the nervous system, the organs of the senses, and all the more important systems of the economy.

After examining the various organs destined for the innumerable secretions of animals, the organs which are prepared for the absorption and for the removal of the decayed materials of the body, we shall observe those systems to become more and more complete in proportion to the general development of the other systems of the economy.

In considering the tegumentary organs which cover and protect all the more delicate organs, we shall perceive that the forms which those systems present, are intimately connected with the living habits, and with the internal condition of the structure. The simplest forms of animals possess an integument, which consists merely of a more condensed portion of the general cellular tissue of the body. A distinct cutis is at length formed, with a cuticle, and with appendices developed from its surface, in the form of hairs, scales, or other protecting organs. Those external appendices have a beautiful relation to the whole condition of the animals. Thus the birds, organised to pass rapidly through strata of the atmosphere of various degrees of temperature—to plunge through those strata rapidly to pounce upon their prey, or to pass to distant latitudes on the surface of the globe, and over mountain chains of high elevation and covered with perpetual snows—are protected with a dense downy covering, a very bad conductor of caloric, by which the warmth of the body beneath is protected from vicissitudes of temperature in the surrounding medium. We shall see the various purposes to which those tegumentary organs are applied, sometimes serving as organs of defence, and sometimes as organs of offence.

In the organs by which the races of animals are perpetuated on the earth, we shall see that the various forms they present, exhibit the same phenomena of gradual development;—that the fissiparous generation of the simplest animals, the gemmiparous generation of higher forms, the oviparous generation, so common in the invertebrated classes, and even as high as the mammalia, and the viviparous generation so characteristic of the highest class, are but different stages of the same great function. In watching the development of the embryo of the most perfect animals through all the stages of its development, we discover that the order in which the various organs are brought into being, corresponds nearly with the order in which they are brought into existence, in ascending from the simplest to the highest classes. That the simplest animals, like the simplest plants, begin by a homogeneous pulp; and that in this are gradually formed all the various systems by which the nutrition of the individual is effected, the relations with surrounding nature are established, and the race is continued on the surface of the earth.

The study of these various objects is highly illustrative of human anatomy and physiology. They constitute the only correct and philosophic foundation for zoological classification. The study of the solid parts of animals is important to the geologist. The contemplation of the various machinery by which animals are enabled to continue their existence for a limited period on this earth, is interesting alike to the philosopher and the naturalist. It opens many new paths of inquiry to the student of nature. It is intimately connected with the duties of the legislator in framing laws for the protection and extension of the animal productions of countries. It opens up to the contemplative mind continual sources of pleasure and admiration, by pointing out proofs of wisdom and design in every form of animal organization. The profound study of these various objects is calculated to unfold the laws of vital movements, and to show that the phenomena of living beings are regulated by laws as definite as those which govern the vegetable kingdom or inorganic nature,—that the movements of animals form as much a part of the great system of nature as the movements of the celestial bodies, and that the whole constitutes one grand and harmonious system of the material world.

Indeed in whatever light we view this study, it presents subjects of inquiry worthy of occupying a philosophic mind. The multiplicity and the endless variety of the objects about which it is conversant, agreeably exercise, while they improve our

mental powers, and their examination affords a healthful employment to our faculties and senses. The facts which the science presents to our contemplation, independent of their practical utility in the anatomy and physiology of man, are calculated to awaken and engage the attention, to interest and occupy the whole mind, to recall our thoughts from selfish or visionary pursuits, and to subdue the inordinate emotions and passions of our nature. Such inquiries afford useful and varied instruction, they constantly excite feelings of admiration and delight, and they leave a satisfaction in the mind from their conclusions resting always on the solid basis of observation and experience. From the consciousness of the life, the feelings, and the varied instincts, which once animated all the objects of this study, our sympathy, which might be unmoved by the examination of an unorganised mineral, is here constantly excited, the heart becomes interested, and the finest feelings of our nature are awakened and improved.

Animals constitute a part of the great system of nature, and their phenomena are regulated by universal laws. The organs of animals form the links of a chain, and their functions form a continued circle of renovation and decay. The close connexion and the mutual dependence of all the phenomena they exhibit, lead our reflections and inquiries to follow always in a connected train. The reasoning powers are thus constantly called into action, are strengthened by useful and varied exercise, and are suitably directed to the discovery of truth. The themes of reflection and the scenes of nature laid open to us by a philosophic survey of the structure and the living phenomena of the animal kingdom, enrich the imagination with varied and interesting imagery, while they extend our knowledge and fill the mind with wonder and admiration. And while these investigations extend our acquaintance with nature and with the sources of intellectual enjoyment around us, they enlarge the boundaries of physical science, and extend our views of that harmony which pervades the universe. They exalt our conception of the great Author of nature, by demonstrating his power, his goodness, and his infinite wisdom, in the minutest and most recondite parts of his creation; and they bring us nearer to him by removing the veil from the most mysterious of his operations in the material world.

LECTURES ON SURGERY,

DELIVERED BY

MR. WARDROP.

THE DISEASES OF THE SANGUINEOUS SYSTEM.

General Remarks.—Of the Blood;—its Functions;—its "Living Principle;"—its Morbid Changes;—its quantity in Man;—its Sensible Qualities—Smell—Taste—Temperature.—Coagulation of the Blood;—its Phenomena;—Utility of Coagulation in Stopping Hemorrhage,—in uniting divided parts,—in the process of Reparation,—and in the Cure of Aneurysms.—Want of Coagulatory Power in the Blood,—sometimes Hereditary,—fatal Cases.—Treatment.—Consistence of the Blood;—Component Parts of the Blood,—Serum,—Red Globules,—Coagulated Lymph.—The Buffy Coat.

HAVING in the last discourse endeavoured to point out what appears to me to be the true principle or the basis for the classification of diseases, I propose now to take a general view of the diseases of each of the systems or textures separately, dwelling more particularly on those affections which have commonly been treated of in systems of surgery. At the same time you must at once perceive how impracticable, indeed, I may say, absurd, it would be to presume to form anything like a classification of diseases of each of the systems which compose the body, and then to divide these into *external* and *internal*, or into those belonging to surgery and to physic. I have already remarked, that no nosological writer has even attempted so unphilosophical a task. In none of their works is there to be found any particular designations or marks by which the one can be distinguished from the other. It is, in fact, not the *science* but the *practice* of the profession of medicine which has been thus divided. In the early ages, medicine was not only considered as one science, but it was practised as one profession. At that period of history, learning was entirely confined to the priests, but a time afterwards arrived when the fathers of the church conceived that it was inconsistent with their pious duties to spill human blood, and this led them to devolve the *operations* of *surgery*, few and unimportant as they were in those days, into the hands of others. Hence arose the division of medicine into *physic* and *surgery*.

The class of diseases we now come to

consider is that of the "sanguineous system," under which is included the various diseases of the arteries, the veins, the heart, as well as of the blood which they contain.

In attempting to draw up anything like a comprehensive nosological table of diseases, it would be of more importance to determine on the arrangement of each of the classes than is required for the present purpose; and I have deemed it most expedient to commence with the "sanguineous system," not only because the diseases of the heart and bloodvessels are numerous and important, but because they form an essential integral part in the composition of the other systems in a state of health, as well as exercise an influence in all their diseases.

But previous to considering the diseases of the vessels themselves, I propose to make some observations on the nature of the fluid which they contain, to point out its more remarkable diseased changes, and particularly to direct your attention to the different modes by which the blood is to be abstracted,—bloodletting being one of the most powerful and most generally employed curative means which we possess in the treatment of diseases.

Of the Blood.

The blood which is contained in the heart, in the arteries, and in the veins, is kept in a continual motion, called its *circulation*. During this movement it undergoes certain regular and constant changes in a healthy animal. It receives new liquids prepared by the process of digestion, and by cutaneous absorption; and it goes through certain changes in the lungs, where it is submitted to the action of the atmospheric air.

It travels throughout the whole body, furnishing to each organ certain materials whilst it is deprived of other parts by the various secretions. That the blood should have been considered as the *life* of the body need not be wondered at; for if its passage to any part be destroyed, that part dies; and if beyond a certain quantity be extracted from the system, the death of the animal follows. The blood is not only necessary for the life, but for the growth of every part of the body; and when any organ suffers an injury, it is the blood which is immediately employed for its reparation.

It is not, therefore, surprising that the blood should have been supposed to possess in itself a "living principle," an opinion first advanced by the ingenious Hunter. The principle of life we must suppose to begin in some one of the component parts of a living animal; and as we observe a chain of phenomena commencing from the entrance of the food into the stomach,—the conversion of that food into chyle,—the mixture of the chyle with the blood,—and the life and growth of the various parts of the animal from that blood,—is it not as probable that the "living principle" is first developed in the blood as in any of the other constituent parts of the animal?

In order fully to comprehend the various functions of the blood,—the morbid changes which it undergoes,—its influence in repairing injuries,—and the various modes and effects of removing it from the body for the cure of disease, it will be proper first to call your attention to its component parts, and the alterations in its qualities and proportions, all which form important indications in the diagnosis of diseases.

Dr. Heberden remarked, that neither the blood nor the urine can afford criteria for the treatment of diseases. I need not caution you against adopting such an unphilosophical opinion; and in proof of its erroneous tendency, I may refer to the subsequent works of Dr. Prout on the *urine*, wherein you will perceive how important a comprehensive knowledge of the chemical qualities of that fluid is, in the diagnosis of the diseases, not only of the urinary organs, but of the whole system; and I have no doubt that if an equally philosophical and active mind were employed in the analysis of the *blood*, much important information regarding the morbid changes of that fluid, and the modes of remedying them, might be discovered. It has indeed been, of late, too much the custom to ridicule the humoral pathology; but this has not arisen from attentive investigations of disease. Velpeau published a memoir wherein he observes how much the humoral pathology has been neglected, but of what great importance it is to become acquainted with the morbid changes which take place in the blood; and to illustrate this remark, he details some cases, wherein puriform matter was found floating in, and mixed with, the general mass of blood throughout the different large vessels, both arteries and veins. In these cases, abscesses in great numbers, though unaccompanied by the usual characters of inflammation, were found in various parts of the body.

It is extremely probable, that the qualities of the blood are considerably altered in many diseases, though such changes cannot always be detected. We observe, for example, a complete alteration in the serum in jaundice, and were it not for that change of colour, we should perhaps

have no evidence that the blood was at all altered in that disease.

Quantity of the Blood.

With regard to the quantity in a man, HALLER supposed that about fifty pounds of fluid circulated in a person weighing one hundred and sixty pounds, of which he considered twenty-eight pounds to be blood.

There has not, however, been yet contrived any mode of ascertaining the precise quantity of blood in different people, and it is not at all improbable that the quantity may vary much in the same individual at different times; neither is it at all certain, whether persons afflicted with diseases which are relieved by the abstraction of blood from the system, have had an undue quantity of that fluid.

It is generally considered, that, in proportion to the size of their body, young persons have a greater quantity of blood than adults, that adults have a greater quantity than the aged, and that fat people have also less blood than lean.

That there is a great difference in the quantity of blood in different people would appear probable, from the circumstance, that if a succession of individuals be observed afflicted with a similar disease, and which requires the abstraction of blood for its cure, the quantity necessary to produce the same effect, varies very much in every different instance, which may probably depend on differences in the quantity of the blood in each person.

Sensible Qualities of the Blood.

Fresh blood emits a peculiar animal *smell*, and a thin vapour rises from it, which is nearly as insipid as water. It is glutinous to the *touch*, slightly saline to the *taste*, and its specific *gravity* is rather more than that of water.

The *temperature* of the blood has not been found to vary much in different diseases, its natural heat having been found diminished a few degrees in the cold fit of ague, and increased during inflammatory fever, and it has also been observed that the arterial is warmer than the venous blood.

Coagulation of the Blood.

Coagulation is one of the most important properties of the blood. Whenever blood is removed from its proper vessels, a process of coagulation takes place, and this coagulation happens sooner or later, according to particular circumstances.

Healthy blood coagulates in about three minutes and a half; the coagulation usually is completed in seven minutes, and in twelve minutes the mass becomes firm.

Blood coagulates in the ratio of its specific gravity, the lighter the blood the more slowly does it coagulate; and coagulation takes place more or less quickly, according as the orifice from which it flows is small or large, or the stream fast or slow.

Coagulation too is rendered more slow by cold. We observe it take place quickly when the blood is received into a basin or flat vessel, and it coagulates soonest if the vessel be metallic. Blood, which is kept at rest, coagulates more slowly than when it is stirred or agitated, and it coagulates most quickly when drawn through a small orifice, and allowed to trickle down the arm. Strong action of the arterial system appears also to dispose the blood to coagulate slowly, whilst, when the vascular action is diminished, as in fainting, coagulation takes place more quietly; and hence the assistance nature derives from syncope, in plugging up the orifice of a bleeding vessel.

The power of the blood to coagulate is essential for the performance of many important functions in the animal economy, whether in a state of health or disease. 1st. It is this quality of the blood which arrests the bleeding from a wounded vessel. 2nd. Coagulation is the means of limiting spontaneous hemorrhages, by plugging up the open mouths from which the blood is poured out; 3rd. It serves to agglutinate the divided edges of wounded skin; 4th. It is important in the restoration of a lost part in forming a covering to prevent the contact of the external air on the newly-exposed surface; 5th. It forms a parenchyma or matrix for the passage of new vessels, for the restoration and regeneration of parts that have been destroyed, as in the process of granulation. 6th. It is the power of coagulation which nature employs to prevent the bursting of an aneurysmal swelling; and, lastly, it is equally useful in plugging up the canals of diseased veins, and in agglutinating their wounds.

As regards *spontaneous hemorrhage*, it has been already observed, that this coagulating power of the blood answers a very important purpose. There are many diseases wherein an effort is made by nature to relieve the general system, or a particular organ, of a superabundant quantity of blood, and there is little or no disposition made to arrest its progress, until considerable debility or syncope supervenes, which promotes the necessary coagulation. And, moreover, when blood is lost by a wound, the diminution in the quantity of the blood, by retarding the force of circulation, creates a power in that blood to coagulate more speedily, and

thus arrests the hemorrhage. Hence is derived the useful practical lesson of encouraging a state of syncope, in order to assist in stopping hemorrhage. Indeed, when syncope does take place during operations, we ought to watch the state of the wound after the syncope goes off before venturing to close it, for it will often be found that vessels begin to bleed, which, in order to prevent secondary hemorrhage, ought to be secured by ligatures.

The importance of this property of coagulation in the blood, is also exemplified in repairing injured or lost parts of the body. When the skin, for instance, is divided, an adhesion of the cut edges takes place, and this adhesion is effected by a quantity of coagulated blood being interposed between the lips of the wound. Here the congulated blood seems to act as a mere bond of union, and I may observe, as a general rule, that whenever you are thus able to keep the lips of a wound together by the adhesive property of the blood alone, you will find it the most preferable mode, and the best plaster.

HUNTER believed, that the coagulum thus formed between the edges of a wound, possessed within itself a power of generating vessels, and thus became organised; but whether under the ordinary circumstances of reparations, new vessels are formed in the midst of the coagulum, or whether they shoot into the coagulum from the adjacent surfaces, and are continuations of those which have been divided, it is certain that vessels meet together and anastomose freely in the coagulum, which, along with the nerves which are also supplied, ultimately constitute a complete organization of what originally was a mass of coagulated blood.

The power of the blood in coagulating for the purpose of the restoration of parts, is exemplified when a portion of the integument is accidentally removed. In such a case, coagulated blood is first deposited on the wounded surface, and coagulable lymph is then effused by the arteries between the coagulum and the wounded surface, for the purpose of forming a matrix for granulations, the growth of which granulations and their subsequent cicatrisation repairing the lost part.

This power of coagulation in the blood is also employed by nature for the cure of *aneurysm*, one mode at least of spontaneous cure, entirely depending on this process. When an aneurysm is formed, the blood which fills the dilated part of the vessel, or the proper aneurysmal tumour, does not circulate either in the same direction or with the same velocity as in the natural condition of the vessel. The consequence is, that a process of coagulation commences in the tumour, and the extent of this process varies according to the form, size, and position of the aneurysm. In some cases the tumour, however small, is found completely filled up with a mass of coagulum, whilst in other cases the parietes of the artery have derived comparatively little additional thickness.

The coagulum, however, in aneurysmal tumours, is not produced quickly, being, on the contrary, a very slow process, and consisting in the formation of one lamina upon another; thus fortifying the parietes of the tumour, so as to prevent its bursting. In cases where the cavity is completely filled, an absolute cure of the disease is accomplished, the diseased portion of the vessel being rendered no longer liable to rupture. There is, however, a difference to be observed between the coagulum of an aneurysm and a common clot of blood, though the distinction has not been clearly pointed out by pathologists. But the observations I have to make on this subject will be more appropriately introduced when considering the pathology of aneurysm.

Want of Coagulating Power in the Blood.

This quality of coagulation in the blood, which, as I have endeavoured to show, is so powerful an agent in arresting hemorrhage as well as other restorative processes, has in some persons been found wanting, and thus bleedings even from very small vessels have not been capable of being stopped, and the hemorrhage has in some instances even proved fatal. As few such cases are recorded in medical works, it may be expedient on this occasion to bring before you all the materials I have been able to collect on this interesting subject, and mention those instances of this peculiarity of blood which have come more immediately within my own knowledge.

Case.—A gentleman found on several occasions great difficulty, and it often required many hours, before he could stop the bleeding occasioned by superficial scratches, such as he sometimes met with in shaving. At last he accidentally received a slight wound on one of his fingers, and every effort to arrest the hemorrhage failing, he expired.

Case.—An interesting case which I conceive to have been of the same description, is recorded by Mr. BLAGDEN in the eigth volume of the Transactions of the Medical and Surgical Society, of a young man, who, at different periods of his life, experienced great difficulty in getting stopped the bleeding from any very slight wound. At length he had a tooth extracted, which was followed by so violent a he-

morrhage, which neither styptics, pressure, the actual cautery, nor a ligature on the carotid artery, could control, and the patient died a week after the operation.

Case.—I attended a patient where the introduction of a common seton needle in the side was followed by a fatal hemorrhage. A gentleman who had an enlarged spleen, was advised to have a seton introduced in the side, and this was done in the usual manner by Sir Astley Cooper. Alarmed by the quantity of blood oozing from the wound, I was sent for to see the patient in the evening of the same day. On withdrawing the cord, pressure carefully applied with graduated compresses did not avail, and the hemorrhage being so profuse as to make it appear probable that some vessel of considerable size had been wounded, I thought it expedient to divide that portion of integument between the two perforations of the seton needle. Having done this, I then found that the blood issued from numerous orifices, and I secured no less than nine vessels with ligatures. Blood continued, however, to ooze from numberless small orifices over the whole surface of the wound, which every mode of treatment usually employed failed in arresting, and the patient died in a few days.

Case.—Mr. Wilson, in his work *On the Vascular System*, mentions a case where a child died from the bleeding of a small bite on the tongue. He states, "I once had an opportunity of inspecting the body of a young person in whom, during life, a very small degree of pressure on any part of the skin, used to produce the appearance called black and blue to that degree, that the nurse in dressing him, although a very careful woman, frequently left the impression of her fingers on different parts of his body. I have frequently seen the child with bruises of a livid colour, arising from falls, or even pressing against anything with the slightest force; if a pin happened to scratch him, a great difficulty occurred in stopping the bleeding, and the application of a single leech was productive of so much danger from the continuance of the hemorrhage, that the child's life was nearly lost. The complexion of the child was fair, and the appearance delicate, but not unhealthy; the pulse was full, but never hard, and the functions of the viscera generally seemed to go on as in other children. When between three and four years of age, the child bit its tongue; there was an impression of the teeth both on the upper and lower surface, but not very deep; the bleeding from the wounds continued for some hours, and having resisted all attempts to stop it, I was requested to see the child. I tried compression and every kind of styptic, which produced a temporary, but no permanent effect, so that although the child lived five days, and during that period I saw it several times in the day, and frequently remained an hour or two with it, though I never failed in producing a temporary stoppage of the bleeding, it was renewed almost as soon as I left the house. I included the whole of the bleeding surface in a ligature, which for a short time stopped hemorrhage, but ulceration very soon took place, and a fresh bleeding occurred; to use the needle was now impossible, as the least puncture produced a bleeding almost as violent as that from the wound. I destroyed the surface by caustic, but the eschar was soon thrown off, and the bleeding renewed; the child became very weak, and, as the bleeding occasionally occurred during sleep, was watched over very carefully; but on one occasion, when upon the supposition that he was asleep, he had not been looked at by the nurse for half an hour, she found that a very slight bleeding, not exceeding a teaspoonful, had taken place, and that the child was dead."

Case.—A curious case came within my own observation, where this deficiency in the coagulating power of the blood appeared to be *hereditary*. A family of which there are several branches, all find a particular difficulty in stopping the hemorrhage from any very slight wound they may accidentally receive, and one of the brothers who had the common operation for fistula performed, died of a bleeding which was occasioned by the incision.

Case.—But by far the most interesting case which has come within my knowledge, and where there was not only a want of power in the blood to coagulate, but where that peculiar state of the sanguineous fluid existed in many branches of the same family, occurred in the practice of Mr. Ward, surgeon, at Ewell, and I shall conclude this part of the subject by relating the circumstances as they were communicated by him to me:—

"The particular state of the boy's constitution was manifested at two months old, when his arm was unusually bruised by a slight blow; and soon after this accident, there was much difficulty in restraining the hemorrhage occasioned by a superficial wound of the lip, and since then, whenever he has had a slight scratch. When he first came under my care, he had received a superficial wound in the palm of the hand a few days previous, and appeared much exhausted from hemorrhage. I attempted to restrain it by pressure, oil of turpentine,—caustic,—and strong acetic acid; and after giving him some

aperient medicine, he took the diluted sulphuric acid in large doses, and astringents. The case becoming very desperate, for the hemorrhage continued unabated for two days after I first saw him, I now ordered a dose of superacetate of lead with opium every three hours, when the hemorrhage soon abated, but whether from the effect of the medicine or not I was unable to determine. It appeared to me to have had considerable influence. I formed some idea of the extent of the hemorrhage by having the arm placed above a plate, when twelve ounces of blood was collected in as many hours. This blood was not at all coagulated, and I could only observe clots when the blood was suffered to collect in folded linen, and then in very small quantities. The boy, after this attack, was completely exsanguined, suffered excessively with all the symptoms of protracted hemorrhage, and it was several months before he recovered.

"Since that time he has been under my care for a wound on the head, the hemorrhage from which was restrained with less difficulty, because pressure could be more effectually used, and at the same time I applied the lunar caustic freely. The bandage remained for more than a week, when an ulcer, having a very offensive smell, of about the size of a shilling, remained. This went through the natural process of granulation, and certainly healed more rapidly than under common circumstances. At this time the boy is well, and is in the eighth year of his age.

"The circumstances connected with this boy's family are equally remarkable. His mother has a numerous offspring, and a brother, who is twenty-two years old, is afflicted in a similar way, and is also an almost constant sufferer with rheumatic gout. He had five uncles and two aunts; all his uncles had the same hemorrhagic tendency, three died from a division of the frænum linguæ, one from the extraction of a tooth, and the other had the same disease, but died from some other cause!

"The aunts had not that tendency in their persons; the one had three boys, two of whom are thus afflicted; the other has two boys and two girls, both boys are afflicted in the same way.

"From the above account, there can be no doubt of the *hereditary nature* of the disease; and it is a singular circumstance, that it is confined in this family to the male branches."

The treatment of such cases becomes an object of interesting inquiry, and a successful analysis of the blood might perhaps teach us how to supply the want of this power of coagulation. These substances, which disposed the blood to coagulate, seemed to have more effect in restraining the bleeding for a time than those which excite the artery itself to contract. Hence styptic applications have been employed, which act by producing a chemical change in the blood with which they are mixed, thereby forming a cake or cement, to supply the place of a coagulum.

Sir C. SCUDAMORE has recommended with much confidence, in a work entitled *An Essay on the Blood*, the application of a saturated solution of the sulphate of alum to arrest hemorrhage. This salt, by producing an immediate coagulation of the blood, has the effect of forming a coagulum at the mouth of a bleeding vessel, and, as will be afterwards more particularly explained to you, thus accomplishes the first step in arresting bleeding. He recommends that the alum solution be warm, in which state it favours the coagulation, and this warm application is not to be considered inconsistent with the application of cold to the parts in the immediate vicinity of the bleeding vessels, the effects of which in diminishing the action of the vessels is well established. The alum solution is to be applied either by compresses wet with it, moderately pressed on the bleeding; or it may be injected into a bleeding cavity, such as the nose, uterus, bladder, or rectum.

Besides the cases to which I have alluded, wherein the want of power of coagulation in the blood seems to depend on peculiarity of constitution, and in some instances on a hereditary taint, there are some other causes which produce deficiencies in the power of the blood to coagulate.

In many diseases, where the solids are verging towards putrefaction, the disposition of the blood to form a firm coagulum is much lessened, as in typhus fever and scurvy. In animals, too, that die suddenly from over exertion, the blood does not coagulate. Most of you may be aware of the difference in the blood of a hare which has been shot, and of one which has been run down by hounds; and in persons who are suddenly killed by lightning, or violent fits of passion, or that have been hanged, the blood does not coagulate. Alkalies, and common salt, entirely prevent the coagulation of the blood, whilst mineral acids promote that process. Is it on this principle that the internal use of mineral acids is so beneficial in hemorrhages? Can this effect of sea salt on the blood, account for the state of it in persons afflicted with sea scurvy? it being well known that this complaint is the effect of eating salt provisions, and that the blood in such persons is unusually thin. We know that this complaint is

also cured by the exhibition of acids. It is also a characteristic feature in the menstrual discharge, that it does not coagulate like common blood, nor does it ever become putrid, until after artificial evacuation, as is exemplified in cases of imperforate hymen, where its exit had been prevented to an advanced period of life.

Consistence of the Blood.

The consistence of the blood is another quality which deserves your attention. Blood, in inflammatory cases, is not only longer in coagulating, but it is also much thinner than natural, which thinness has been proved by Hewson to depend on the greater attenuation of the lymph. He asserted that the blood is thinner, when in a state of inflammation, than in health, and this is apparent to the naked eye. The whole mass of inflamed blood, before coagulation, is actually thinner than the serum of the same blood is, after coagulation has taken place, and the crassamentum or clot separated from it. Hence the disposition of arteries in an inflamed part to throw out lymph, may, more or less, depend on this change in the blood. Whilst blood is flowing into the basin, our eye enables us to form some notion of its consistence, but this is best ascertained by the time it requires to coagulate. A firm texture of blood has been generally considered as a mark of a strong action in the arteries, and as pointing out the propriety of abstracting it, and, on the other hand, when its texture has been very loose, the utility of repeating venesection has been considered questionable.

The Serum.

Soon after coagulation, the mass of blood separates into two substances, the crassamentum and the serum.

The serum, or watery part, exudes through the pores of the congulum, whilst the latter, at the same time, contracts itself, leaving the sides of the vessel containing it, but preserving its form. The coagulum, which contains the red colour, constitutes the *crassamentum*.

The proportions of the serum and crassamentum are various, but in healthy blood they are nearly in equal quantities; whereas, in very stout and laborious people, and during some inflammatory diseases, the crassamentum is in the larger proportion.

The serum is a fluid of a pale straw colour, has a slight saline taste, is somewhat viscid, and rather heavier than water, with which it mixes readily. When exposed to a moderate heat, it coagulates into a white glutinous mass, and the same effect is rapidly produced by its sudden admixture with an equal quantity of boiling water. Serum also coagulates on being mixed with the diluted sulphuric, nitric, or the muriatic acids.

The part of the serum which thus coagulates, either by the application of heat, or admixture of acids, possesses all the chemical properties of the white of egg, and has been termed the *albumen*. When serum is coagulated by heat, there oozes out from the mass a small quantity of a viscid fluid, which has been termed the *serosity*, and is a mucous fluid.

The serum has been found of a white colour, like cream, and to contain globules, which peculiar appearance has been attributed to an admixture of the chyle with the blood. This appearance, however, has usually been met with in the serum of persons whose appetite has been impaired, and who have been subject to sickness and vomiting. Hewson supposed this change of colour to arise from absorbed fat, and states that all the persons in whom he found white serum were plethoric, and were relieved by bloodletting. If a person be bled soon after dinner, the serum appears milky.

The serum is in greater quantity in what has been called *sizy* than in healthy blood, and the greater quantity which makes its appearance when you examine a vessel containing such blood, arises from the strong contraction of the fibrin forcing all the serum out of the clot. In such blood, the coagulum is remarkable in its shape; in place of having a smooth, plain surface, its edges are inverted, and it swims in a large quantity of serum, this peculiar form being denominated "cupped."

When serum collects in a preternatural quantity, either into the cellular texture, or into any of the serous cavities, as those of the pleura, pericardium, or peritoneum, it produces the disease called *dropsy*.

The Red Globules.

Hunter supposed that the red globules were an indication of physical strength, and that the stronger an animal was, the more red globules did its blood contain. Wild animals have a greater proportion of red globules in their blood than those which have been domesticated, and there is a curious difference in the colour of some muscles in the same animal, depending, no doubt, on the colour of the blood; this is particularly remarkable in the pectoral muscles of the black-cock, one set being much paler than the others.

The colour of the globules themselves varies in different vessels of the body, and there is a difference in shade or in-

tensity of the colour of the blood from the quantity of globules which it contains. There are also diversities of shade of the blood in the different systems of vessels. It is of a bright scarlet colour in the arteries, and purple in the veins, and it is changed from the scarlet to the purple in passing from the ramifications of the aorta into the veins. Hence the variety of shades of red, in different inflammations, arising from the differences in the proportion of the number of arteries and veins of the inflamed part. When kept at rest, the blood in the arteries becomes of a dark colour, and extravasations of arterial blood into cavities, if not exposed to the atmospheric air, also assumes a dark colour.

Although blood is usually dark in the veins, it is not so under all circumstances. For when a large orifice has been made in a cutaneous vein, the blood which immediately follows the withdrawal of the lancet is black, but this is sometimes succeeded by blood of a florid scarlet colour.

The blood is also found of a florid colour in the veins of a part affected with common inflammation, and if the bandage used in phlebotomy has been kept some time on the arm, the blood which first flows from the orifice is very dark.

In diseases obstructing respiration, the blood is likewise of a very dark colour. This is the case during a fit of asthma. In diseases where the respiration is quick, as in phthisis, the blood is usually florid, and indeed, in inflammatory diseases generally, the blood is more florid than natural.

The red globules are not distributed, like other parts of the blood, throughout the whole frame, as appears from the want of the red colour in certain parts of the body. In some diseases their number is increased, at least in particular parts, and this may alone depend on the change in the size of the containing vessels. When much blood has been taken from the body, the red globules are not so soon renewed as its other parts, hence the paleness which often exists for a long time after copious depletions.

Mr. Brande has found, that the menstrual flux in its component parts resembles a very concentrated solution of colouring matter in a diluted serum.

Changes are also observed in the colour of the external or cutaneous bloodvessels in many diseases, which informs us that changes must have taken place in the sanguineous fluid. Observe the varieties of red in the colour of the lips and cheeks, in the eyes, and in the skin covering diseased parts. Observe the various changes of the kind of redness in the skin around different ulcers—changes which alone, in many instances, tell us the nature of the disease!

Richerand amputated the arm of a very old man, who for thirty years had an ulcer on his arm, which was connected with a varicose state of the veins, and the health of this individual was much impaired. During the operation it was observed, that the blood as it flowed from the arteries was much less red than that which was lost by a young man whose leg was taken off on the same day. In fact, the venous blood appeared as if dissolved, of a violet colour, or somewhat like that produced by log-wood; neither did it coagulate like that of the young patient; it separated into a serous fluid, containing a few clots very little coloured.

The Coagulable Lymph.

The coagulable lymph, *gluten*, or *fibrin*, is that part of the blood which, as has already been mentioned, forms with the red globules the *crassamentum* or clot.

When the crassamentum is deprived of its red globules, which may be readily done by allowing a small stream of water to pass upon it, and by squeezing out the serum, what remains is the coagulable lymph, in the form of a white, tough, elastic mass, having a fibrous appearance, even in some instances apparently formed into laminæ.

It is this ingredient of the blood which renders it susceptible of coagulation, when removed from the living body, both in certain healthy and diseased processes,—a change, whether we regard its rapidity, its degree, or its various modifications, which forms an important diagnostic character in particular diseases. Mr. Dowler, in his ingenious paper, observed, that when inflammation takes place accompanied with effusion, the first substance that escapes is serum,—but if the inflammatory action increases, then *fibrin* is effused, and the inflammation still increasing, pus is formed.

While the blood is in a fluid state, the coagulable lymph cannot be separated from the serum, but in disease this separation often takes place. Hence coagulable lymph is effused on the surfaces of inflamed membranes, or into cavities, such as those of the pleura and peritoneum; whilst in other diseases, the serum is separated from the blood, and collected in cavities, forming the different kinds of dropsies.

The coagulable lymph is found in the greatest quantity in the blood of those afflicted with inflammatory affections of the fibrous textures, particularly rheumatism.

There is a very considerable difference to be sometimes observed in the quantity

of the coagulable lymph in blood taken in different cups from the same patient at the same bleeding. In some instances this difference has been observed nearly one-half. The coagulable lymph of healthy blood is more firm than that of sizy blood.

The Buffy Coat.

Whilst the blood is coagulating, the process of coagulation takes place in healthy blood so quickly, that the red globules are diffused throughout the whole of the crassamentum. But this is not the case in many diseases wherein the coagulation occurring more slowly, the red globules, being from their greater specific gravity separated from the coagulable lymph, are found disentangled at the bottom of the vessel. In some cases the coagulation takes place before the red globules have scarcely reached below the surface of the crassamentum; and this portion, deprived of red globules, forms what is called the "buffy coat." The appearance of a buffy coat is generally described as one of the most striking characters of the inflammatory diathesis. A buffy coat, however, is not to be considered, either as a certain test of inflammation, nor is it a safe index of the propriety of bloodletting. Whilst inflammatory diseases are at their acme, there is often no appearance of the buffy coat in blood taken from a vein; but in the latter stage of inflammatory disease, and when blood can no longer with propriety be abstracted, the buffy coat becomes remarkable. In local inflammation, before the constitution appears much influenced, the blood which is drawn from the larger vessels of the inflamed part, has been found to form a buffy coat, whilst blood drawn from distant vessels does not show the same disposition.

In the advanced stages of pregnancy it has often been observed, that the blood has a peculiar disposition to form a buffy coat. The buffy coat or "inflammatory crust," as it is likewise called, is of very different degrees of thickness, and the time required for its production varies from a few minutes to upwards of half an hour.

Dr. TWEEDIE once saw the buffy coat in blood taken from the temporal artery of a person labouring under pneumonia, and the great prevalence of the buffy coat in diabetes first led Dr. WATT of Glasgow to treat that disease by frequent bleedings. The state of the blood, more particularly however as it regards the buffy coat, is by no means to be considered, as has already been observed, as a certain indication for the employment of bloodletting.

Dr. HAMILTON has observed, in his work *On the Use and Abuse of Mercurial Medicines*, that blood drawn from the arm of the most delicate and debilitated individual, subjected to a course of mercury, exhibits the same buffy coat as blood drawn from a person labouring under pleurisy.

Having now concluded the observations I purposed to make on the qualities, component parts, and more remarkable diseased changes, of the sanguineous fluid; in the subsequent lecture I will endeavour to point out the effects of abstracting blood from the system in the various forms of disease, and of the different modes by which it is to be accomplished.

ALDERSGATE-STREET DISPENSARY.

MEETING

OF MEMBERS OF THE

MEDICAL PROFESSION

RESIDING

IN LONDON.

THE public meeting of members of the medical profession, which we last week stated was to be held at the Freemasons Tavern, took place on Saturday, the 12th inst., when about five hundred physicians and surgeons assembled. The proceedings of the evening were transacted in the great apartment known as the Committee Room, which, however, proved by no means capacious enough for the gentlemen who attended. Great numbers, therefore, were obliged to leave without obtaining admission into the room, while others crowded the adjoining landing-place and stairs. The following is a copy of the advertisement by which the meeting was convened:—

"A general meeting of members of the medical profession will be held at the Freemasons Tavern, Great Queen Street, on Saturday, the 12th instant, for the purpose of expressing their approbation of the conduct of the late medical officers of the General Dispensary, Aldersgate Street, in resigning their situations rather than act under laws which are equally injurious to the respectability of the profession, and the real welfare of charitable institutions at large. The chair will be taken at 6 for 7 p.m. precisely, by Dr. Elliotson, F.R.S., Physician to St. Thomas's Hospital, and Professor of Medicine at the London University."

Dr. ELLIOTSON entered the room shortly

after the hour of 7, and immediately took the chair amid the applause of the assembly.

The CHAIRMAN then addressed the meeting as follows:—Gentlemen, this is the first time I have ever taken the chair at a public meeting, excepting in those institutions in which I have the honour to hold office. Although I am continually before the public, I can assure you that this is altogether owing to the accident of my profession, and not to my natural inclination; for, by nature, I am inclined to retirement. Indeed, I never do appear in public, except with more or less anxiety, so that when I lecture to my pupils, I always do so with a timidity that is very observable to them. I trust, therefore, that you will pardon any inefficiencies that may attend me on this occasion. When I was requested to take this chair, I hesitated for one moment, that I might ascertain the following points:—First, "whether a certain regulation had been made by the governors of the Aldersgate-Street Charity;" and, secondly, "whether, in consequence thereof, the medical officers of the institution had resigned." I received to each of these inquiries an answer in the affirmative, and, therefore, in spite of my own disinclination to appear in public, I at once consented to preside, conceiving that I was doing myself a high honour by accepting the offer; and I trust, that on every occasion in which the welfare, respectability, and character of the profession is concerned, I shall never exhibit any disinclination of my own, but shall always step forward to avow my opinions, as I think it the duty of every professional man to do. It appears, Gentlemen, that this meeting has been summoned on two accounts; first, to express its disapprobation of a certain regulation, and next to express its approbation of the conduct of certain medical officers which has been pursued in consequence of that regulation. I need not say, that the regulation which was considered so obnoxious by the medical officers of the Aldersgate-Street Dispensary, was that which enabled any one to vote at an election upon paying a guinea seven or eight days previously. No wonder, Gentlemen, that a regulation was so obnoxious, which did neither more nor less than put up the medical offices of that institution to sale. (*Applause.*) It would be much better not to have an election at all than this, which must be a mere farce and a deception. It would be more manly, more open, to say that the place would be put up to auction on a certain day; and if the office of a medical man is to be put for sale, why not that of treasurer, and the other honorary offices, if honour be at all worth purchasing? On this occasion the most responsible places have been offered for sale; for, as to saying that no one can take office who is not "qualified," we all know that a large number of persons may pass a certain examination, and yet not two of them be found qualified to the same extent, among the many who undergo it; some of the "qualified" may possess infinitely more knowledge than others. The principle of purchase then must be absolutely bad. (*Applause.*) Neither can such a system contribute to the good of any charity, because those who are valuable supporters of any institution, must feel inclined to withdraw their aid, when they see the places are offered to the highest bidder. A large subscription may, indeed, be obtained for one year; but persons who pay for such a purpose, do not subscribe again, and many who are in the habit of continually supporting the institution, must feel indignant, and discontinue their support. I do not hesitate to say, that if I were a subscriber to such an institution, however useful it might be, I would instantly withdraw my subscription, and endeavour to do the same good with my money in another direction. Again, it must be injurious to all medical charities, in an indirect way, by lowering the character of medical men. It is to the interest of every such institution, that medical men should have the highest tone of feeling possible: and if indignity is thus offered to them, and if places are not made places of merit, where merit should have some influence, but are offered to the highest bidder, and if medical men continue to offer themselves to such institutions, the certainty is, they will do so with a lower tone of feeling, and be less anxious to do their duty than becomes them, and the profession altogether must be injured. Horace asks,

> Is tibi melius suadet, qui rem facias, rem,
> Si possis recte, si non, quocunque modo rem?

It is in truth a bad plan simply for a charity to look to obtaining the largest amount of money. It is not that which the medical man simply regards; but there is a character and dignity and honour in the profession which we always expect, and if the public takes away that, the profession must sink, and the public suffer. Gentlemen, upon the other point—the resignation of the medical men, I think there can be but one opinion. (*Applause.*) If it is said that the regulation in question existed before, and that this was only a restoration of an old rule; that reply is of no consequence whatever. If the rule had existed even up to the last year, and

an improvement had been then made, the attempt to restore the rule ought to have been resisted by the medical men, because it would have been an attempt at falling back; whenever we have gained a step, we ought to maintain our ground, and never, if possible, recede an inch. If it be the first time medical men have resigned on such an occasion, so much greater the honour to those who have now done so *(applause)*; and I trust that all medical men who may be placed in a similar situation, will henceforth take courage and resign likewise. (*Great approbation.*) I look upon what has taken place as a sign of an improved feeling in our profession. (*Applause.*) I trust that in spirit and in feeling our profession is improving rapidly in every quarter, and I think it is the duty of all the medical profession to come forward in support of their brethren, whenever they conscientiously can—whenever they see their professional brethren to be right; and I am sure this is a time for the profession to come forward. I hold in my hand a letter which I received this morning from Colchester, written by Mr. Costello, dated October the 11th, in which that gentleman says, "I have been lately at Northampton, seeing some patients. The curiosity which lithotrity excites in the country, brought many of our brethren together. I took advantage of the large assembly about me, to allude to the noble stand which the Aldersgate-Street medical officers have made for the independence of the profession. The bare mention of it excited the highest enthusiasm, and resolutions were instantly and unanimously passed in approval of their conduct. Yesterday at Ipswich I was equally fortunate in being surrounded by medical men—upwards of seventy of our brethren from Suffolk and Essex, and I can assure you the same *esprit de corps* would have produced a similar approbatory address, had it not been announced that the medical officers of Aldersgate-Street had accepted office again. I write you this hasty note to show you the spirit which exists in the provinces, to be used as you think proper, if the intended meeting should take place to-morrow." I have taken the liberty of saying thus much, Gentlemen, because, from the nature of the advertisement, it is presumed that all who attend here and take a part in the proceedings of this evening, are of one opinion, otherwise I should not have ventured so to express myself. I can only say further, that I trust those gentlemen who speak will consider that the meeting expects nothing will be said but what relates entirely to the business before it; and that no personality will be thought of, nor any unworthy motives be assigned to those who have acted in a way which we disapprove. I trust that all will be harmony, and that while we profess to be standing up for the honour of the profession, we shall all so conduct ourselves as to afford an example of what we profess, and thus maintain its respectability in conduct as well as in word. With these feelings I beg to propose,—"That this meeting views with extreme "regret the schism that has taken place "between the governors and the medical "officers of the General Dispensary in "Aldersgate-Street; and being equally "zealous for the welfare of the sick poor "of all such charities, as desirous that the "high and honourable character of the "medical profession should be sustained, "feels called upon to adopt the following "resolutions." (*Applause.*)

Dr. James Johnson.—Mr. Chairman and Gentlemen,—In rising to lay before this great assemblage the resolution I hold in my hand, I hope I shall be pardoned for premising that I have no personal interest in any public institution in this metropolis, and that therefore my opinions must be considered wholly disinterested, for I can safely say, that in this point I am as free and as independent as the air I breathe. But I confess that I am personally and deeply interested in a paramount institution—the profession itself (*hear, hear*), to support the honour and dignity of which I hope all present attend. The resolution I am about to submit to you, appears to me to involve two fundamental principles of great importance in medical polity; the first I consider to be, that professional merit alone should be the passport to professional appointments in medical institutions; the second is, that candidates for such appointments should have a fair arena for competition, and never be aided, checked, or influenced by wealth. If we allow money to be thrown into the scale against merit, we commit great injustice, and establish a dangerous precedent. If gold is made to weigh in favour of demerit, we commit a crime against common decency, sense, morality, science, and, in the long run humanity itself. It is known to all, that a law written, like those of Draco, in the blood of its victims, which openly connives at, if it do not encourage, such venal elections as I allude to, has been recently enacted in a medical institution, and it is to reprobate this law, and to show the world that the medical profession will never sanction it, that we are here assembled. *(Applause.)* I trust, therefore, that the verdict this night will consign it to the everlasting execration of the profession from the rising

to the setting sun. I shall now read to you the resolution that has been put into my hand; it is this:—"That it appears to this "meeting, that in all establishments for the "charitable supply to the poor of medical "and surgical aid, it is highly discreditable "to the character of such institutions, and "detrimental to the real interests of the "poor themselves, that the medical and "surgical offices should be subject to laws "that might even by possibility render "them places of purchase and pecuniary "contest." Gentlemen, if there should be any individual present who is disposed to differ from the terms of this resolution, let him listen to the following statement, for the authenticity of which I pledge my honour. I shall not give the name of the charity nor the name of the individuals, lest they should appear in public print, but I am perfectly ready to give them to the Chairman should they be required. A few years ago in a charitable institution, not many miles from this metropolis, a salutary law existed by which no governor could vote at an election, unless he had subscribed for the space of three months. A vacancy, however, took place, when a gentleman with a long purse determined on putting himself into the office. A junto of governors accordingly was assembled, who rescinded the old law, and enacted a new one, by which every man who paid a guinea was allowed that instant to vote; and not only so, but also to vote by proxy. *(Cries of "Shame.")* When the day of election came, although there were several candidates, many of them with high pretensions, a gentleman came down to the Board, took seventy guineas out of his pocket, put them on the table, wrote on slips of paper seventy names, put them into the box, and elected his man. *(Cries of "Shame" repeated.)* What was the consequence? why a great number of governors were so disgusted that they immediately withdrew from the institution, which was thenceforth likely to become defunct. But the venal law was rescinded, and the institution again flourished. *(Applause.)*

Mr. Pettigrew.—Having been absent from town, it was not till yesterday that I heard of this meeting. In the first place, therefore, I now offer my thanks to the gentlemen of the committee who invited my co-operation on this occasion. I am happy to attend, because I conceive it is my duty, as a professional man, to exert myself in every way to support the character and respectability of the profession. I am more interested in this matter than may be known to most who are present. I chance to be a life governor of this institution, and knew the determination of the general meeting of governors not to renew the law, in consequence of the practice which took place at the contest (I believe) between Mr. Ellerby and Mr. Salmon, when not only seventy guineas was paid, but, I believe upwards of *seven hundred guineas. (Shame, shame.)* This occasioned an alteration of the law. Knowing this, I felt it my duty to go down as a life governor in company with Mr. Norris, the son of the celebrated man who was known to many of you, and who was thirty years surgeon to that institution, with a resolution, which was carried, that it was inexpedient to agitate the subject again; but, to my astonishment, I found afterwards that a different resolution had been adopted, the consequence of which was the calling together of this meeting. Every professional man must deplore the circumstances which led the medical officers to resign; and I should not discharge my duty if I were not to say, from my own knowledge of them, and of the manner in which their duties were discharged, that I regret deeply on account of the poor objects of the charity, the necessity for their resignations. I believe that no institution in this metropolis, abounding as it does with valuable charitable institutions, and attended as they are by the ablest medical officers, has ever had more competent, if such competent, medical officers as this dispensary. This dispensary has also furnished a medical school. I believe it is the first that has had, and the only one in town at this moment that has, such an appendage.* It was, Sir, owing to the manner in which this parent institution was conducted, that I did suggest to an illustrious individual to become the patron of it; and it is a matter of no little gratification to me to find that illustrious individual has acted in a manner to show that he appreciates the conduct of the medical officers, deprecating that which must be injurious, and forming, as he does, a proper estimate of what is due to our profession. Heartily concurring with what has fallen from my friend who has just sat down, and with the observations made from the chair, I second this resolution. *(Applause.)*

The affirmative of the resolution was then put from the chair, and nearly every hand was exhibited in its favour. When the negative was put, one hand was raised against it. It proved to be that of a Mr. Hurle, an apprentice of Mr. Stanley This demonstration of opposition from a person not yet belonging to the profession,

* This is an error of the speaker. There is no "medical school" belonging to the Aldersgate-Street Dispensary.—*Rep.*

elicited hisses and roars of laughter. When the merriment had subsided,

The CHAIRMAN said,—The resolution having passed with the approval of every one but that young gentleman, it is now too late, otherwise I should have liked to hear his reasons for the objection. *(Cries of "He has nothing to do with the profession," and "Hear, hear."*

Mr. HURLE.—I should like to know if the old officers are canvassing a second time. *(Roars of laughter.)*

The CHAIRMAN *(smiling)*. I believe not; but that has nothing to do with the resolution.

[The young gentleman was here seized with the epidemic, and joined in the laughter which had been involuntarily raised against him.—The pressure in the room from the efforts of those who were without to obtain admission, was now so great, that a cry of "Adjourn to the hall" was generally raised; but on an announcement being made that a considerable time must elapse before the hall could be lighted and prepared, the proposition was abandoned.]

Dr. HASLAM next presented himself, and was received with applause.—I believe, he said, that it is unnecessary for me to make any preamble concerning the resolution I am about to read. I most cordially subscribe to everything that has been said by the worthy and learned President, and by the gentlemen who have followed him. With respect to dispensaries, Gentlemen, this is not a new practice, but it is one that ought to be discontinued. *(Hear, hear.)* In the year 1793 I was a candidate for a vacancy in a dispensary, and I had collected together out of 250, 130 votes. I was waited upon by a competitor, who said, "You need give yourself no further trouble, I mean to buy the office." *(Loud laughter.)* Every gentleman is to be respected who is as good as his word. On the day of election the gentleman paid down 500 guineas in the names of new subscribers, and had by him 1000 guineas more, to use in the same manner, if such auxiliaries had been necessary. *(Laughter, with expressions of dissatisfaction.)* I had the satisfaction of having the old voters on my side, but to decrease that consolation, the purchaser of the office set the bells a-ringing that we might enjoy his triumph. I know two more such instances. In one (and the institution perished thereby) they made it a point to have a physician every three years, for it was presumed, as a commercial speculation in the dispensary, that in that time a doctor was worn out *(laughter)*. A *surgeon*, it was supposed, might last *five* years *(laughter)*. It only remains for me to read the resolution I have to move. The character of the gentlemen who have occupied the medical offices in the general dispensary is so high for literary talent, medical experience, general respectability, and private worth, that anything like eulogy would, in my opinion, almost amount to defamation. The resolution runs thus:—"That the cordial thanks "of the profession are most justly due, "and hereby given, to Drs. Birkbeck, Clut-"terbuck, Lambe, and Roberts, and "Messrs. Salmon and Coulson, the late "physicians and surgeons to the general "dispensary, for their honourable and in-"dependent conduct in resigning their ap-"pointments rather than sanction the re-"introduction of a law involving the ob-"noxious principle condemned by the pre-"vious resolution." I am sure you will all unanimously object to the honourable situation of physician or surgeon to a public charity being put up to auction and knocked down like an article of household furniture. *(Applause.)*

Dr. WALLER.—I shall content myself by simply seconding this resolution. Any addition to what has fallen from my friend Dr. Haslam is unnecessary; moreover, I have been closely connected with the gentlemen who have acted in the honourable manner alluded to, and were I to speak much on the subject, it might be attributed more to my own private feelings than regard for the profession. *(Hear, hear.)*

The CHAIRMAN then put the resolution, which was carried unanimously.

Dr. UWINS.—I feel that I should do most justice to the resolution which it devolves on me to move, by merely announcing it. But as custom requires somewhat more than the mere enunciation of such a proposition, I must claim your indulgence for a few additional moments. The axiom in everybody's mouth, which declares that "knowledge is power," is capable, in my mind, of being very essentially amended—I should say, that "knowledge is respectability;" and if proof of it were wanted, I should appeal to the condition of the medical profession at this moment, compared with what it was even in my recollection. *(Hear.)* But, Gentlemen, it is not sufficient that each individual of the medical profession be conscious of pursuing a respectable line of conduct for himself, in reference to his private circumstances, but it behoves each individual belonging to a respectable and honourable profession, to consider himself as a part of a body whose respectability his individual exertions should tend to establish, always recollecting that *esprit de corps* is, in all instances, exceedingly operative to-

wards producing a grand and general result. With this feeling, I beg leave to read the resolution in my hand:—"That "the various members of the medical "profession, residing in and near the "metropolis, are hereby requested to affix "their names and places of abode to the "foregoing resolution, and that books, "with the resolutions transcribed, will be "opened for this purpose at the medical "booksellers of London." I feel convinced that there is not a member of the profession who will not hasten to the poll, as those who are accustomed to the language of contests say, and attest his feeling in support of the rank and dignity of its members, which is daily and hourly increasing. (*Applause.*)

Mr. Smith.—As it is exceedingly desirable that we should know how many of our professional brethren possess the opinions involved in the resolutions which have been passed by you this evening, I beg leave to second the resolution just read. It is time that our profession should emancipate itself from the commercial slavery in which it has been involved. It is time that it stood upon its own basis. It is quite time that we were separated from the influence of those who are actuated by petty non-professional feelings on such occasions as these—from the influence of individuals whose conduct is inconsistent with the high feeling and tone, the integrity, the dignity, and the honour, which I think must always belong to the medical profession. And I do hope that the number of names which will be affixed to these resolutions, will induce the practitioners of the present day to adopt measures which will place the profession on some better footing than that which it has heretofore occupied. (*Applause.*)

The resolution was then carried.

The Chairman.—Gentlemen, the purpose for which this meeting assembled has now been accomplished. Its opinion has been passed on those points which were referred to in the advertisements, and it has, therefore, now only to dissolve. I congratulate the profession on the largeness of the assembly, and its unanimity and harmony.

Dr. James Johnson then (on the motion of Mr. Pettigrew) took the chair, when

Dr. Roots presented himself, and said,—The resolutions have passed with such unanimity, that I am quite satisfied the proposition I have to make to you will be received, if possible, with greater unanimity, to use an Irishism. (*Laughter.*) I have to ask a vote of thanks from you to the chairman who has just vacated his office. He is so well known to the profession at large, that I am sure it is unnecessary for me to dilate upon his manifold merits. (*Loud and general applause.*) I have had the happiness of knowing him most intimately—I am afraid the statement will make us both seem very old—(*laughter*)—for the last eight-and-twenty years; and I think that no man is more calculated, from his talents, integrity, and independence, to step forth on such occasions as the present. I shall not make any attempt at oratory, but only claim a unanimous vote of thanks from you, for the excellent and impartial conduct of the chairman. (*Applause.*)

Mr. Law seconded the resolution, or rather, moved "that it be seconded unanimously."

Dr. Johnson.—I believe it has been seconded unanimously (*much laughter*),—that is an Irishism, but as I am an Irishman I must be allowed to make one. I believe it is strictly true, that if each individual present were to come to this table, he would second this resolution. (*Hear, hear.*) It has, therefore, been put and seconded unanimously, that the cordial thanks of this meeting be given to Dr. Elliotson for his excellent conduct in the chair. (*Carried unanimously.*)

Dr. Elliotson.—Gentlemen, I return you my warmest thanks. I feel that what Dr. Roots in the warmth of his friendship has been pleased to say of me, is anything but deserved, but I always endeavour to live so as to merit the good will of the profession, though I trust I shall never put myself forward on any occasion unnecessarily; I also trust that I shall never fail to promote the good and the honour of our profession, nor shrink from the discharge of any duty through a wish to please some persons, or a fear of displeasing others, however high their station or great their power. (*Loud applause.*)

The meeting then separated, the whole proceedings having occupied exactly one hour.

ADDRESS FROM NOTTINGHAM.

At a meeting of the medical practitioners of Nottingham, lately held in the Exchange Hall, pursuant to requisition, Dr. Marsden in the Chair,

The following resolutions (amongst others) were unanimously adopted:

Moved by Dr. Pigot, and seconded by Mr. Watts, "That this meeting most highly approves of the conduct of the medical officers of the Aldersgate-Street Dis-

pensary in resigning their situations, when they could no longer hold them with honour to themselves.

Moved by Dr. J. C. WILLIAMS, and seconded by Mr. R. DAVISON, "That the following Address be presented to the late medical officers of the above Institution, expressive of the high sense of their conduct entertained by the medical practitioners of this town; and that copies of these resolutions and of the Address, be transmitted to the Editors of THE LANCET and the Medical Gazette.

ADDRESS.

To the late Medical Officers of the General Dispensary, Aldersgate-street, London.

"Gentlemen—We hasten to address you to record our high sense of admiration of your conduct in resigning your situations at the Aldersgate St. Dispensary. We cannot sufficiently admire, we cannot sufficiently approve, we can scarcely find language sufficiently energetic to convey to you those sentiments of esteem and gratitude which pervade our breasts when we reflect upon, the noble stand you have made, on honour and principle, against the short-sighted and debasing attempt to open the appointments at public charities to the highest bidder.

"Gentlemen, we thank you. We cannot sufficiently deprecate the attempt, which would be the means of enabling men of the lowest reputation in our profession, *the mere traders in physic*, to place themselves in public situations by the force of money—keeping out, by so doing, those high-minded, honourable, and talented individuals, whose moral worth and humane characters must be a guarantee for their kind attentions to the poor, and whose object in seeking such situations will be to extend their usefulness to their fellow-creatures.

"Gentlemen, such usefulness has been your object in your late attendance at the Aldersgate-Street Dispensary; and high as some of you have already enrolled your names in the temple of science, still higher have you ALL enrolled your names as examples to your medical brethren of honour, integrity, and moral worth, as opposed to the sordid calculations of gain.

"It seems to us that the individuals who supported the unwise and degrading proposition, viewed their subscriptions as superior to the time and industry and talent given by the medical officers to the poor of that charity. We are ashamed even to entertain such an idea. *Where* there is disease and penury—*there*, patiently, laboriously, and unostentatiously, is the medical man found alleviating suffering and distress; and even when pestilence walketh abroad, fearlessly does the medical man seek the abode of poverty, risking his own life, and the support he is to his own family, to save the life of the poorest of his fellow-creatures.

"Gentlemen, it is high time that the services of medical men to public charities were viewed in a proper light, and that instead of considering these gentlemen as the mere instruments of the benevolence of subscribers, it was steadily impressed, that medical officers are the very corner stones of charities, for without them no medical charities could exist.

"Gentlemen, we have now another link in the chain of honourable medical independence, and we repeat our thanks to you most cordially, for your disinterested conduct. Allow us to remain, Gentlemen, with the greatest respect,

(Signed by)

"W. MARSDEN, M.D.
JOHN MITCHELL DAVIDSON, M.D. senior Physician to the Nottingham Hospital.
JOHN CALTHROP WILLIAMS, M.D., Physician to the Nottingham Dispensary.
WM. VALENTINE, F.L.S., Surgeon to St. Mary's Hospital and Dispensary.
JOSEPH THOMPSON, M.R.C.S., Surgeon to the Nottingham Dispensary.
AUGUSTUS GREAVES, Surgeon to the Nottingham Dispensary, M.R.C.S., L. & E.
JOHN HIGGINBOTTOM, Surgeon.
ROBERT DAVISON, Surgeon to the Nottingham Dispensary.
JOHN CAUNT, Surgeon.
ANDREW BLAKE, Physician to the General Lunatic Asylum.
W. WATTS, Surgeon.
THOMAS ALLEN, Surgeon to Not. Disp.
JOHN WRIGHT, Surgeon.
AUGUSTUS DARBY, Surgeon.
J. N. THOMPSON, Surgeon.
JAMES BUTLIN, Surgeon.
F. MAN, Surgeon.
BECKIT TRUMAN, Surgeon.
G. M. WHITE, Surgeon.
GODFREY HOWITT, M.D., Physician to Nottingham General Hospital, &c.
A. R. SANDERSON, Surgeon.
B. EDDISON, House Surg. to Genl. Hosp.
JOSEPH WHITE, Surgeon.
THOMAS BEVERIDGE, Surgeon.
ALEX. MANSON, M.D., F.R.S. Edinburgh, late senior Physician to General Hospital, and lately Phys. to Lun. Asylum.
T. WOODCOCK HALL, Surgeon, late House Surgeon to the Doncaster Dispensary.
THOMAS KITELEE, Surgeon.
JOHN ATTENBURROW, senior Surgeon to the Nottingham Hosp. and M.R.C.S.
R. HUTCHINSON, M.D., Physician to Nottingham Hospital.

HENRY OLDKNOW, Surgeon to the General Hospital, &c. &c.
J. M. B. PIGOT, M.D., F.R.S. Edinburgh, formerly senior Physician to the General Inf. &c. of the City of Chester.
HENRY CLINTON ATTENBURROW, Surg.
WILLIAM WRIGHT."

ADDRESS FROM CORK.

"To the Ex-Medical Officers of the Aldersgate-Street Dispensary, London.

"GENTLEMEN,—We, the physicians and surgeons of the *Cork General Dispensary*, viewing with pleasure your manly and determined conduct, beg to offer our tribute of applause. We rejoice in the act as the commencement of a great change. The medical profession has too long submitted patiently to ill-treatment from men who, placed in a little brief authority, have used that authority as a means of petty tyranny. And we feel that the entire body of the profession will not only approve of such conduct, but act upon it, should circumstances render necessary such measures. We have the honour to be, Gentlemen, with sincere esteem, your obedient servants,

T. MACKEY, M.D. (Surgeons)
M. M'NAMARA, M.D. W. F. PORTER, M.D
J. COPINGER, M.D. R. T. FOWLER, M.D.
T. LUCEY, M.D. L. H. ORPEN, M.D.

Cork, Oct. 12th, 1833."

LONDON MEDICAL SOCIETY.

Monday, October 14th, 1833.

Mr. KINGDON, President.

CONTINUATION OF THE DEBATE ON THE RICE AND CHOLERA QUESTION.

ON the arrival of the time for renewing the debate on this important subject,

Dr. SEOANE rose, and said that he had perused with the highest interest and attention the statements of Dr. Tytler, and thought that the greatest discovery of modern times would be made, if Dr. Tytler could prove his position, because it would then be so easy to prevent the spread of cholera, all preventive and sanatory measures being reducible to one phrase, "Eat no rice." But we are yet (continued Dr. S.) far from such a discovery I fear, for although Dr. Tytler has clearly shown that rice has frequently been the predisposing, and sometimes the exciting, cause of the disease in India, he has failed to prove that it is the principal, essential, or specific cause. One particular reason, however, for my being interested in this debate is this. Two years ago my attention was carefully directed to the subject of the cholera, and I then read every work and paper on the subject which I could obtain. Amongst other views, I met with those of Dr. Tytler, and in a report on the causes of the cholera which I drew up for the Spanish government, I noticed his statements. My opinion was not very favourable to his theory then, and it is not more so now that I have read his remarks to this Society. I embodied my objections in the following paragraph, which I ask your leave to read, and I hope that Dr. Tytler will be kind enough to reply to them.

Dr. TYTLER.—Had not the questions better be put to me singly, that I may answer them one by one? It will be much easier than for me to answer a host at once. In fact, I come here to-night to be interrogated.

Dr. SEOANE.—It will not take long to read. (The extract mentioned the nature of Dr. Tytler's doctrine, admitted that "Nobody could doubt that damaged rice, like any other damaged food, could be a cause of disease, or that when bad food of any sort forms the principal nourishment of a large body of people, an epidemic disease can be produced amongst those people," but added, that the disease would be confined to the place where the bad food existed, and contended, "that it would be ridiculous to suppose the rice of 1817, whatever it had done in Bengal, had been travelling for the last 15 years, and producing the Asiatic cholera in Arabia, Persia, Africa, Russia, Turkey, Poland, Germany, England, and France.") I still hold this opinion notwithstanding all Dr. T. says. The point to be decided is, in my opinion, whether damaged rice is only a predisposing and exciting cause, or a principal and essential cause. There is an immense difference between a predisposing and exciting cause, and a principal one. Further, Dr. Tytler has enumerated amongst the bad doings of rice, the destruction of the Spanish expeditionary army at Cadiz in 1819, to which I reply, that the army was not destroyed at all. I presume Dr. Tytler knows by this time, from my speech, that I am a foreigner. I am a Spaniard, and formerly was a member and secretary of the Committee of Public Health during the Cortes. In my official capacity it fell to my lot to get all the official documents belonging to the Cadiz epidemy of 1819. I examined many medical men who had been employed during it, and drew up a report,

containing all the facts respecting it, and I assure Dr. Tytler, that with the exception of the garrison of Cadiz and San Fernando, where all the troops did not amount to 2000 men, the army had not one single soldier affected with the yellow fever. The facts are these:—In July there were strong symptoms of revolution in the army near Cadiz, and the government sent to the interior all the regiments belonging to it, leaving only two battalions of the regiment of Soria and a company of that of the Queen at Cadiz and San Fernando. When the epidemy broke out at Cadiz in September 1819, the army was very far from the focus of it, and, consequently, did not suffer; even the troops which were at Cadiz did not suffer so much as in other epidemics. They did not lose two men in all. Besides, I cannot believe that the Bengal rice belonging to the crop 1817, which Dr. Tytler brings to Gibraltar, had anything to do with the Cadiz epidemy, as he affirms without the least proof, because the Spanish rice is so good and so extremely cheap, that it is impossible to suppose that the Bengal rice could be smuggled into Spain. But whatever it may be, the most convincing proof that the rice must not bear the blame of anything bad that occurred at that time, is this, that while the soldiers of the army who ate rice in great quantities were in the best possible health, because they were far from the focus of the epidemic, the inhabitants of Cadiz who ate very little rice, but who were within that focus, suffered dreadfully from it. A few words more, and I have done. I see in THE LANCET a note, in which it is said that the expeditionary army did not go to America in consequence of the destruction supposed by Dr. Tytler to have occurred. It is true that it did not go to America, but it was not for the reason which the doctor gives, nor had the epidemy anything to do with it; for two months after the end of the epidemy, that is in January 1820, the army was again assembled near Cadiz, and ready to embark, when they rose and proclaimed the Constitution. That revolution was the essential cause of the army not going to America, as it is also of my being now occupying the time of the Society.

Dr. TYTLER.—I have heard the gentleman with great attention, and I am glad that he has referred to official documents. I admit their value, and that it is of great importance to ascertain the facts regarding the troops in Cadiz. When I was in Calcutta, I was told that the rice could not be the cause of the disease in the Upper Provinces, because it was certain that the people only ate *ottah*, made of wheat, bajrah, jooar, barley, &c., and that the cause of the cholera was in the atmosphere. Yet I got to the *Upper Provinces*, and found the rice there, and then I was told that rice could not be the cause of the disease at *Penang*, because the inhabitants of Penang received their rice from *Pedir*, on the coast of Sumatra. But when I removed to Penang in 1823, the very ship in which I sailed was actually laden with Bengal rice, destined for the markets at Penang and the other islands. When I left Calcutta, I was told that the rice could not be the cause of the cholera in London, because the deleterious rice did not exist there, and yet in the very first shop I entered to look for it, I found it selling at three half-pence a pound. The argument, therefore, of the rice not reaching Cadiz, is an argument *quoad viam*, and not *quoad rem*. Then another gentleman comes to me and says, "How can you "account for the disease in Sunderland? "Is the rice there too?" Why, gentlemen, I saw an individual since the last meeting of the Society, who awakened my attention to that subject, by saying he was going to Sunderland, when I asked him if he knew anything about the cholera there, and what the people fed on, to which his reply was, that an ordinary article of diet, in Sunderland was rice and cold salmon. There, then, you have the rice in Sunderland. Does any gentleman dispute the fact attested by Dr. Duncan relative to the goat which perished after eating deleterious rice. If not, that fact is one which forms a very great point in my case; because, if deleterious rice will act in one place, it will act in others, and that it reached Spain I will presently prove, no matter in what shape it was eaten, or how disguised. Here is rice flour and wheat flour (Dr. T. laid some of each on the table), and I say that no one can tell which is the wheat flour and which the rice, unless he is intimately acquainted with them. Let me mix them. Now who can produce a test by which the adulteration can be established? Well; here is the kun, the poison, and I mix it with the wheat flour and the rice flour. There; that is the appearance of the common ottah of India, and I ask how is this to be detected but by such facts as I have brought forward? I remember reading some years since the conviction of a baker by the lord mayor, for mixing rice with flour, and I know that in India the kun is often mixed with flour; and yet it is said that rice is not eaten. It is almost impossible, in fact, to detect the adulteration. Rice is subjected to bleaching, a process in which the grains are either broken, or become ready to break on being touched. Here is a speci-

men of it before me, in some of the grains in which the bleaching has not been perfectly effected. The article which is sold as tapioca in this country, is, in my belief, in numerous instances, manufactured from rice, though they say in the shops that it comes from the West Indies. The rice which I have purchased in London is undoubtedly the rice of Bengal; I recognise it to be so; and yet it was sold to me as rice from Africa. I suspect that that rice is brought from India to England, thence taken to Africa, and then brought again to England, and here sold as African rice; and we know that in our colonies in Africa there has been a great mortality. I return now to the disease in India and Spain. Dr. Seoane allows that rice is a predisposing cause, but he will not admit that it is an essential cause. I am not prepared to call it either. I only say that its use produces the disease, and others may say what kind of cause that is. Then with regard to the Spanish army, if I am wrong in my statements, Dr. Seoane must attack the newspapers, and not me. I could not be in Spain and India too. I could only derive my information from the newspapers, and I will read what they said about it. The *Calcutta Journal* of Feb. 22nd, 1820, states, "A letter from "Gibraltar, dated Oct. 2, 1819, says, 'Our "'commerce has lately had many very "'severe shocks, from repeated failures "'of great houses, and from the epidemic "'raging in Spain. Rice continues un-"'saleable at two dollars per cwt.'" The *Bengal Hurkara*, of Feb. 21st, 1820, says, "By the arrival reported above, we have "received private accounts from Gibraltar "to the 18th of October, and Cape papers "to the 11th of December. From the "former we learn that the yellow fever "had been raging dreadfully at Cadiz, "and at the period of the latest advices, "was still increasing in violence. In the "beginning of October the deaths there "by this pestilential disease were up-"wards of 60 per day, and in the middle "of the same month they had become "more than 100 daily." Now is that gentleman prepared to say that there was no disease in Spain, and that the rice was not then selling at Gibraltar?

Dr. SEOANE.—I have not denied it; but I *have* said that where they ate rice there was no disease, and that where the yellow fever was there was no Bengal rice, for the Bengal rice cannot be introduced into Spain at all. The troops ate Valencia rice.

Dr. TYTLER.—Why Bengal rice was selling at Gibraltar at that very time at two dollars a cwt., which must have been of the growth of 1817, because the crops of 1816 failed, and 1817 rice must have got from Gibraltar to Cadiz close adjoining. And that rice was actually eaten by those afflicted with the pestilence I shall prove, by the following documents, written by the late Mr. Murphy, a Roman Catholic clergyman at Calcutta. The first is this:—"Mr. Murphy, on the 20th of "June, 1823, declares to Dr. Tytler, that "he was at Cadiz in the year 1819, when "the pestilence raged furiously in Anda-"lusia; and further states that the sol-"diers, destined for the American expe-"dition, were most miserably treated "with regard to provisions, having to "live on bad bread and rice. He, Mr. "Murphy, was himself frequently in the "habit of taking rice to dinner, and he was "affected with the epidemic in that city." Signed "F. B. MURPHY." The second is this:—"Four of my countrymen of the "order of St. Augustine, who had, to my "certain knowledge, frequently eaten rice, "were all affected with the distemper, of "whom one died. Moreover, in my own "convent, amongst numbers who were "infected with the distemper, about ten "had departed this life, and they were all "likewise in the habit of eating rice." Signed "F. B. MURPHY."

Dr. JOHNSON.—But we are calling yellow fever cholera, though Dr. Halloran has shown us that one of the symptoms of the fever in Spain was black vomit, while the vomit in the cholera is white.

The PRESIDENT.—Dr. Tytler has said that both cholera and other destructive fevers result from the use of rice. He does not mean that cholera is the only disease thereby produced, and as he is here to state *his* case, he has a right to say that the yellow fever of Spain was a disease so caused. The soundness of his proofs is what we have to consider.

Mr. MARSDEN.—Then if that is the case, I am rather of opinion that I and many other gentlemen attend here to night under a wrong impression. (*Loud laughter.*)

Dr. BURNE.—We are not here sitting in evidence on the similarity or dissimilarity of diseases.

Dr. TYTLER.—I am here to establish my case, and being in order, I proceed to show that it is not the first time that yellow fever has been ascribed to the use of diseased grain as an article of food. Dr. Bancroft says, in his Essay on the Yellow Fever, that the epidemic of 1764 was described by Dr. Salvarez or Salvaresa, a principal physician at Cadiz, whom I dare say that gentleman knows (Dr. SEOANE *here nodded assent*), as resembling the yellow fever of America. He, indeed (says Bancroft), calls that epidemic "vo-

mito priesto," because black vomiting, as well as yellowness of the skin, frequently occurred. Now you see what is Salvaresa's explanation of the black vomit; and in Sir James Fellowes's Reports, it is stated that Salvaresa said the disease was confined entirely to Cadiz, and was occasioned by old and corrupted corn. I have nothing to do with *names*. It is no spoke in my wheel, because Dr. James Johnson and Dr. Seoane don't know the difference between *morbus oryzeus* and *yellow fever*. (*Hear, hear.*) Oh, shade of Hippocrates! is science to be stopped at the very threshold of her inquiries, because medical gentlemen are unaware of such differences as these?

Dr. SEOANE.—My objections have not been answered. Bengal rice cannot be introduced into Spain at all. The rice of Cadiz was Valenciennes rice.

Mr. MARSDEN.—Why does Dr. Tytler go abroad for causes? (*Laughter.*) Has he seen any cases in London. (*Cries of "No," "No," all around.* "He does not profess it." "He has had no opportunity.") I have, within these few days, searched everywhere to learn what rice has had to do with cholera here, and I find that not in one case in ten has rice been eaten at all. If you agree with the Doctor, who says that rice is the exciting cause, then you must believe that rice has been eaten in each case, which is not the fact. It is well known that a batch of oysters at night has, in many cases, produced the disease before morning.

Dr. JOHNSON.—My conscience, Sir, is laying under a very heavy burden, in consequence of the statement made by Dr. Tytler last Monday, that I had been the author of four or five millions of deaths from the cholera—a great many more, I fear, than I have saved—and he says that his doctrine was not fully received or examined in India, in consequence of four or five lines in my journal, though, by-the-by, I do not think that I wrote those lines, for everything is not Dr. Johnson's which is printed in Dr. Johnson's journal. I think, however, that I shall set the question at rest, as far as I am concerned, by the following official document from the Madras Medical Reports. In 1823 the Medical Board of Madras, in consequence of the statements of Dr. Tytler, instituted an inquiry into the truth of the very doctrine which Dr. Tytler says I so unceremoniously quashed.

Dr. TYTLER.—I never said quashed.

Dr. JOHNSON.—The Board sent circulars to various medical officers in charge of troops amongst whom rice had been eaten, and the following is a copy of one of them, signed by the secretary of the Board, and dated March 13, 1823:—

"Sir,—Dr. Tytler, of the Bengal establishment, having advanced an opinion, "which he still supports, that the epi- "demic cholera is caused by eating noxi- "ous rice, the Medical Board are led to "expect that the fatal attack of the dis- "ease which was experienced last year in "your corps may afford an opportunity "of setting the question at rest, by *posi- "tive evidence*. They accordingly request "that you will endeavour, by a reference "to the cases, and by strictly questioning "a number of the men who suffered from "the disease, as to their having used, or "not used, rice of any description, from "the time of reaching Madras Roads, to "that of their being taken ill, to ascertain "the facts of the case, and report thereon "for their information." Now it is very strange, indeed, if my few words on Dr. Tytler's pamphlet so biassed the boards, as he has alleged, that the Madras Board should have set on foot such an inquiry. (*Hear, hear.*) To this circular the following reply is attached in the document I hold in my hand, written by Surgeon Cowen, of the 41st Regiment, and dated from Fort St. George, March 14, 1823:—

"In reply to yours of the 13th instant, "respecting the opinion of Dr. Tytler rela- "tive to the epidemic cholera being caused "by eating noxious rice, I beg leave to state, "that on referring to those men who la- "boured under the disease, and question- "ing them relative to their diet, I have "ascertained that scarcely any had made "use of rice, the first division, which "landed on the 8th July, having been on "batta for ten days after their arrival, "and the second, which disembarked on "the 17th, being on the same diet, viz. "bread, beef, and potatoes, for three days. "During the first fortnight I can positively "assert there was no rice used, and as far "as I have been able to ascertain, it was "six weeks or two months before it came "into general use; long before which the "epidemic entirely disappeared. That "noxious vegetable matter may produce "disease I have no doubt. In this instance "it must be attributed to some more "powerful cause, many of the second "division having been attacked with the "disease on the morning of their arrival, "and fell victims to its malignancy dur- "ing the day." Why people from Europe were often taken ill with cholera on the very morning they set foot on shore, and when, consequently, they could have eaten no rice, and the only deleterious thing they *could* have got hold of was drink.

Dr. TYTLER.—I am rather deaf. Would Dr. Johnson have the goodness to repeat that word again. I think he said *drink*.

Dr. JOHNSON.—*Drink*, I said.

Dr. TYTLER.—*Drink*. Yes, drink. Very good.

Dr. JOHNSON.—The following is from another letter, written by Mr. Hamilton, surgeon of the 54th reg., dated Bangalore, March 21, 1833, in reply to the circular of the Medical Board:—"There are now "at head-quarters 85 men, who suffered "an attack of cholera while in Fort St. "George, who have been separately and "distinctly questioned as to their diet, and "whether they were in the habit of using "rice, either with curry or soup, pudding, "or in any shape whatever. Of these "men there are only ten who state that "they ate rice at any time previously to "marching from the fort on the 4th of "June, and a great majority of the "others declare, that up to the present "time they have never used rice, from dis-"like to that article of food."* Mr. Hamilton says, at the close of his letter, "I have no prejudice, no theory to bias me," and that he conducted his inquiry with the strictest impartiality. Now I think this fairly exonerates me from the charge of Dr. Tytler. Well, Sir, Dr. Tytler told us last Monday, that the rock on which he took his stand in support of the rice doctrine, was the jail of Allahabad. He said, that the immensity of the prisoners in that jail, in consequence of his vigilance in keeping out damaged rice, was the *rock* on which he would stand. Now had Dr. Tytler looked into the works which have been written on cholera, and the medical journals of this and of other countries, and been acquainted with the discussions in our medical societies, instead of deriving his information from newspapers, for he said he knew nothing about the cholera in Europe, excepting through the newspapers *(hear, hear)*, which I need not say are very bad sources of information on some subjects, and had read the doctrines of the contagionists, he would have known that the latter gentleman long ago established a regular chain of these "rocks," from the Jumna to the Clyde, though upon a very different principle,—that of quarantine against contagion, and without any reference to damaged rice, or, indeed, any kind of food. Sometimes the "rock" was in the shape of a fortress, which remained free from cholera, while the neighbourhood was ravaged. Sometimes it was a convent, sometimes a jail, a military college, or a barrack. A rock of the latter kind was set up at Sunderland, where the soldiers remained free from cholera, in consequence, as was supposed, of strict quarantine, and without any reference to rice or other article of diet. The jail at Allahabad was one of the rocks on which the contagionists built their doctrine, and now Dr. Tytler makes it one of *his* rocks. In short, we ought to keep to facts which happen under our own eye.

The PRESIDENT.—That Dr. Tytler professes to have done in India.

Dr. JOHNSON.—Then, too, in not a single mineral watering place in England has cholera originated or spread. Did they eat no rice at Cheltenham, Leamington, Malvern, Bath, Buxton, Matlock, and Tunbridge Wells? But, not to occupy the time of the Society too long, I shall only offer one more argument, or, rather, fact, against the ricean etiology of cholera. The disease raged at Newcastle for, I believe, more than a month, during which time not a single case occurred at Gateshead, on the opposite bank of the Tyne, though a free communication existed between the inhabitants of both places, by means of a bridge. Now the people of Gateshead were of a grosser description than their opposite neighbours, and more likely to have damaged rice if they used any. Suddenly after a month's immunity from cholera, a sharp north-east gale blew in a direction from Newcastle to Gateshead, and next day the cholera was universal in the latter place. The inhabitants of Gateshead went to bed in health, and awoke next morning with the cholera in twenty different parts of the town. Now

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* The subjoined remarks are added by Mr. Hamilton to the above statement:—*Rep. L.*

"Among these men there are very many of the best character, and several non-commissioned officers, upon whose veracity I am disposed to place the firmest reliance; and in order to afford the Board the fullest elucidation on the subject, I herewith subjoin a scale of the messing of the soldiers while at Madras:—

Dinner.

1 pound of beef.
1½ pound of bread.

Breakfast.

For vegetables for soup			20 cash.
Butter	-	-	20 cash.
Tea and sugar	-	-	40 cash.

"By this scale it is evident, that rice did not enter into any part of their diet, and the Board are of course sufficiently aware of the habits of European soldiers, to know that their balances, after messing and purchase of necessaries, are usually expended on much more deleterious articles than rice. In addition to the foregoing evidence, I have questioned several of the pay-sergeants and others, on whose word every confidence may be placed, and their answers have been uniform, that, with the exception of a few married people, who are indulged in living by themselves, they never saw rice used while in the Fort. Under any other circumstances than those in which I was placed, I should have been able to add my personal observation on the subject, having been always in the habit of frequently inspecting the men's messes, but the pressure of duty which devolved on me during the continuance of the epidemic, rendered this duty impossible."

that any man having the power of reason, should believe that the month's immunity was owing to abstinence from damaged rice, and that the sudden invasion of Gateshead was dependent on the sudden introduction of rice into the diet of the inhabitants, is past my comprehension. *(Hear, hear.)*

Mr. Headland.—I am anxious to call attention to certain important facts connected with this discussion. Dr. Tytler has given a narrative of the cholera from its first appearance in Jessore to its occurrence in Great Britain, and in accounting for its production he has laid on the table of the Society specimens of vitiated rice. But I beg to ask if any man believes that the most humble and poverty-stricken individual in this empire would purchase rice having the appearance of any one of the samples laid on the table? *(Hear.)* But I was amazingly startled indeed when we were told that this discoloured rice was often bleached in England, ground, and made into bread; and I determined to make it my business to obtain the best evidence I could respecting those assertions. I accordingly went to persons who were likely to be well informed on the subject, and I now state the following facts on the faith of authorities for whose respectability and veracity I pledge myself. The wheat crops throughout Great Britain were unusually bad and deficient in the years 1816 and 1817, the seasons being very wet, and the price of the quartern loaf rose to 18½d. At present it is only 9d. The effect of this was, that rice was resorted to as a cheap substitute for flour, and in such quantities, that many bakers put as much as 10 lbs. weight of rice flour into every sack. This practice continued for three years only, for in 1818 wheat fell in price, and from that year until the present time, no rice whatever has entered into the composition of bread in London. Yet during the period of that mixture, no cholera existed in London, while latterly it has prevailed here to a frightful extent. In corroboration of the fact that no rice is now mixed with flour, it may be stated, that the very best flour can be obtained at 1½*d.* a pound, while the very worst rice cannot be bought at less than 1½d. a pound. In fact, the gentleman, and his partner from whom I derived my information, tell me that no rice is mixed now with flour, because the value of rice is too high. I have not the slightest doubt that poisonous rice is capable of causing disease, but I assert that the disease which it will produce, is very different from cholera. Its effects on the goats mentioned by Dr. Tytler, prove this. The genital organs of one of them, for instance, exhibited phagedenic ulcerations, and in the other, mortification occurred; those parts in both instances, dropping off. No such effect ever takes place in cholera patients. On the contrary, it is remarkable that no organic lesions are ever found in them. Dr. Tytler said on a former evening, that in every experiment he had made with rice, he was astonished by some new effect. But is this in accordance with our knowledge of any poison whatever? Is it the case with belladonna, hyoscíamus, prussic acid, or any vegetable poison we know? Why, then, should the Society ascribe such phenomena to rice? Ergot of rye produces specific effects, though it is known that it will affect the spinal marrow; but that is an exception, and I have no doubt that poisonous rice will produce none but specific effects. These are strong arguments against the doctrine of Dr. Tytler. Before I sit down, Sir, I beg to say, that I consider this to be a very important discussion, and one which demands minute investigation on the part of the Society. The statements of Dr. Tytler (abundantly evident as they are that rice will produce disease, though not cholera) have taken the round of the public journals, and everybody is talking about the effects of rice. The question ought, therefore, to be set at rest, and a strong effort made to remove from the public mind the unnecessary alarm which is now felt.

Dr. Tytler.—I am indebted to that gentleman for the statements he has made, for they establish mine. (*Laughter.*) He has said, on the authority of a flour-dealer, that in 1816 and 1817, rice flour entered largely into the wheat flour of this country. This statement was made to him by a gentleman who was deeply interested in any avowals he might make or keep back. (*Hear, hear.*) Now, mind; men don't attack *present* Kings, but *past* Kings? Mr. Headland's informant will not, *of course*, allow that rice is mixed with flour in 1833. No; but the facts of 1817 may now be disclosed. But I have the pleasure here of having Dr. Johnson on my side, for in the last Number of that celebrated work, the *Medico Chirurgical Review*, Dr. Johnson says, in his review of Dr. Ayre's work on cholera,—

Dr. Johnson.—Every review that appears in that work is not Dr. Johnson's review. I am not responsible for all that appears there. It may be Dr. Ayre's statement, and not mine.

Dr. Tytler.—The paragraph I allude to is the writing of the Editor, and it states that Dr. Ayre says the cholera was epidemic in 1817, the very year that Mr. Headland says, that rice-flour was largely mixed with wheat flour, and Dr. Ayre de-

scribed that disease in 1818. Mr. Headland has referred to my experiments in which gangrene was produced in the goats. But that is not the chief of my experiments; it is only one of them, and I alluded to it because it connects the effects of rice with the effects of ergot, and proves that the diseased rice is either affected with real ergot, or is a modification of that distemperature. I *did* say that new symptoms were developed in each experiment, and Mr. Headland says that ergot will produce an effect on the spinal marrow. With respect to the variety of symptoms, they occur according to the organ affected by the rice in the course of its circulation through the system. I thank him for the information respecting the effect of ergot on the spinal marrow. I did not know that such was the case; but the fact is important to me, for I once gave common coarse rice to a goat, and it produced a tumour on the spine. The details of that experiment I have now before me, though they have not been read to the Society. The *variety* of effects produced by rice is not wonderful. Will not arsenic produce different effects according to the extent of the dose? and mercury the same? I will now refer to what Dr. Johnson has said about the inquiry instituted by the Madras Medical Board in 1823. By alluding to official documents, Dr. Johnson in a manner ties up my hands, because I know not that I can, with propriety, so allude to them as to confute the inferences drawn from the letters of Mr. Cowen and Mr. Hamilton. I have already undergone, on account of this very question, sixteen years of such persecution as I hope no member of this Society will ever experience, and therefore I shall now only say, that it would have been a far more satisfactory course had the Board sent their circulars to me for information, instead of applying to young and inexperienced surgeons, who had just arrived with troops in India. (*Hear, hear.*) Dr. Johnson says that I ought to have gone to medical works, and not to newspapers for my information. Dr. Johnson means, perhaps, that I should have read his book. What! was I, in the midst of jungles, wildernesses, and hills, where I could scarcely get carriage even for medicines, much less for books, to run about with his journal tied to my heels? Where was I to get books or reports? Why, Gentlemen, I had *nothing* but newspapers to read, and glad was I to get even them. Instead of studying theories, and reading arguments, I was looking for facts in the very field of observation, where alone facts were to be obtained. I was placed in situations where I was called upon to *act*, not to discuss. (*Hear, hear.*) In short, this paper of the Madras Medical Board does not militate in the slightest degree against my facts, because it does not at all allude to the quality of the bread which the troops ate, nor of the liquor which they drank. Now it gives me pleasure to refer here to the work of my able antagonist, Dr. James Johnson. He let fall the word *drink* in the course of his remarks just now. Very good. In his work on tropical climates, he describes a liquor named "samsoo," to which I referred on a former evening.

Dr. JOHNSON.—The quotation is from Bontius, who says that the liquor is made with *holothuria*, and I say that it is holothuria, and not rice, which gives it its deleterious property.

Dr. TYTLER.—And I say it is the rice, and not the holothuria.

Dr. JOHNSON.—Dr. Tytler misquoted me on the first evening of debate respecting the *samsoo*. He has put into my mouth the words of Bontius.

Dr. TYTLER.—Then I will give him his own words. But, first, here is the quotation from Bontius. At page 16, Bontius says,—"The principal cause of this dy-"sentery is the drinking an inflammatory "liquor, *arac*, which the Chinese make "from rice and the holothuria, or what, "in Holland, we used to call quabben, or "quallen." And here are the words of Dr. Johnson, which he says were misquoted, he having forgotten what he had formerly written. I take them from the second edition of his work on Tropical Climates. "The liquor retailed to sea-"men in China, is certainly of a very de-"structive nature. Its effects have at-"tracted so much attention, that when "his Majesty's ships are leaving the coasts "of India for China, there is generally an "order received from the Admiral, en-"joining the officers to guard as much as "possible against samsoo among the crews, "which, says the order, is found to be "poison to the human frame. The ordi-"nary mode of preparing samsoo is as "follows:—The rice is kept in hot water "till the grains are swollen. It is then "mixed up with water, in which has been "dissolved a preparation called *pekah*, "consisting of rice flour, liquorice root, "anniseed, and garlick." These are not the words of Bontius, but of Dr. Johnson. Bontius never mentions samsoo. He speaks of arac. This is, then, the kind of liquor, samsoo or arac, which is made use of by troops on their arrival in India, and destroys numbers of them. Thus, Gentlemen, want of information is made a standard for my knowledge.

Dr. JOHNSON.—I saw in THE LANCET

the words ascribed to me, and the reports in that Journal are remarkable for their accuracy.

Mr. Langford.—I rise to prove, by some facts with which I am prepared, first, that rice may be eaten without producing cholera, and, secondly, that we may have cholera without rice having been eaten at all. If I succeed in this, I think I shall have done a great deal towards dislodging Dr. Tytler from his position. I have had some experience in the disease having superintended the Knot-hill Cholera Hospital at Manchester, during the prevalence of the disease. To set this question at rest, I wrote the other day to gentlemen of Manchester and Bilston, where the cholera was so violent, to learn how far rice was used in those places, and I have also made inquiries on the subject at a great number of workhouses in London. With regard to these latter, I find, in every instance but one, that rice is an article of food, though it is of so excellent a quality, that threepence a pound is paid for it in all of them. Yet in each establishment they have had cholera with this pure rice. The exception was that of Clerkenwell, where, though no rice was used at all until ten days after the cholera appeared, 69 persons died out of 438. In the Manchester and Salford prison, I learn from the surgeon, that rice has never, within his knowledge, been given to the prisoners at all. Yet there have been 100 cases of cholera there, and it is a very curious fact that the disease began amongst the males, and did not, till some time after, appear amongst the females, though they were all fed from the same store. At Bilston, where the population is 14,000, there were 742 deaths from cholera; yet the Rev. Dr. Lee writes to me from that place, that he does not believe there is any other town in England, where, in proportion to its population, so little rice is consumed. From Manchester, Mr. Ollier, the surgeon, writes to me that he is convinced that rice is very seldom eaten by the inhabitants. He adds, that all the inferior Bengal rice which is sold there, is chiefly bought for the use of poultry, and is only kept by one house, that of Messrs. Price. It is quite clear from these facts, that rice has nothing to do with cholera in England, and if we were to travel to India, I dare say we should find that other causes produced the disease there also. Were it not so late, I should show, too, that the rice is not eaten in the form of bread, but at present I must postpone that subject.

A Gentleman here ended the debate, the hour for its conclusion having arrived, by saying that a lady in the country told him that she actually fattened her chickens on inferior rice at a penny a pound, instead of corn, and that she greatly preferred it for its good effects.

The meeting was then adjourned to the 21st, when the subject will be resumed. The room this evening overflowed with members and visiters.

THE LANCET.

London, Saturday, October 19, 1833.

The week just ended has proved an important one for our profession. The events have been characteristic of the excitement which pervades every medical circle, and the existing indications are both bright and cloudy. The meeting of physicians and surgeons, on Saturday night last, was most respectably and numerously attended; but we feel called upon to declare our decided opinion, that the Committee, by whom the preliminary business was arranged, forgot the chief part of their duty. Having approved of the conduct of the ex-medical officers of the Dispensary, was nothing else demanded? Were there not *candidates* for the vacant offices? Are the gentlemen present prepared to meet those men in consultation, to associate with them, to treat them as individuals who have not sullied the character of the medical profession of England?

Criticism, however, is not our object on this occasion. We have neither space nor inclination for comment. Besides, the election at the Dispensary will not terminate until after this sheet is printed, and in that election it is possible that the seal of authority will be affixed to a diabolical specimen of professional delinquency.

Just previous to the meeting of Saturday last, WILLIAM HOLT YATES offered himself as a candidate for the office of physician to the Aldersgate-Street Dis-

pensary. But with this addition to the names of CASWALL and WYATT, there are, even now, only three individuals belonging to the ranks of the profession who have declared that they are ready and willing to act under a law which openly sanctions the medical destruction of the poor. Not one individual, be it remembered, who was *known* in the profession, or who was respected for his attainments, has consented to become the tool of the Dispensary Committee. WILLIAM HOLT YATES, CASWALL, and BURKIT WYATT, are the only three candidates for notoriety. The addresses, from the medical practitioners of Nottingham and Cork, are spirited and appropriate, and furnish the best evidence of what would be the conduct of those practitioners, if they were required to act professionally with such men as the three notorious candidates.

When the Governors of the Dispensary assembled on Monday last, the LORD MAYOR in the Chair, for the purpose of inquiring into the causes which led to the resignation of the medical officers and the Duke of SUSSEX, an amendment to the original motion was brought forward, in which it was declared to be inexpedient to enter upon any such inquiry. This amendment was carried by an overwhelming majority, and the most insulting language was used towards the profession by Mr. HEWITT, an attorney, who endeavoured to ornament his discourse by throwing in a thimbleful of school-desk Latin, and by Mr. CARPENTER, one of the Editors of the *True Sun* Evening newspaper. On this occasion, WYATT, CASWALL, and YATES, had the felicity to hear the profession denounced in the grossest terms of vituperation. At the conclusion of the proceedings, by way of climax, a vote of thanks was given to the Committee, but not until Drs. BIRKBECK and CLUTTERBUCK, and Mr. SALMON, had been openly insulted by the majority of the speakers.

Thus, then, we have only to be furnished with the result of the election now to be held, to enable us to be in full possession of the details of the whole question. While, therefore, we take this opportunity of entreating our readers to examine, with minds perfectly unprejudiced, every portion of the subject, we earnestly entreat of them to consider what ought to be the conduct of the members of the College of Surgeons, with respect to allowing CASWALL and WYATT to belong to their body. If we do not adopt some measure far more decisive than the one which was last week proposed at the Freemasons Tavern, the honour of thousands will be tarnished, if not sacrificed, by the cupidity of two or three individuals who have offered to become the tools of the declared enemies of the profession.

A PROMISE was given by Mr. EARLE, in November last, in the presence of a numerous class of pupils, that no post-mortem examination of interest should take place at St. Bartholomew's Hospital, without a notice of such examination being given to the "surgical" pupils. He also stated that he had consulted with his colleagues in office on the subject, and that they fully concurred with him as to the propriety of the arrangement; yet fourteen days of the present session have elapsed, and not a single notice has been posted for the information of the pupils, although several examinations of interest have taken place.

Mr. EARLE at the same time said, as we have before intimated, that some rails should be erected, for the purpose of keeping the area of the theatre clear during operations. But neither has any part of *this* promise been kept, and instead of the area being kept free from intruders, it is still crowded by them. On Saturday last, for instance, not less than thirty-four persons stationed themselves in that part of the theatre, and kept pos-

session of it during the time of operation. "How deeply annoyed were the suffering patient, and the students who endeavoured to look on from above, may easily be judged," says a pupil who has written to us on the occasion. "To seek redress from the surgeons for this grievance," he adds, "is useless. Our only hope is derived from the exposure to which an unshackled medical press will subject their conduct."

REPLY TO THE LETTER OF MR. SCOTT.

To the Editor of THE LANCET.

SIR,—I have but a very brief reply to make to Mr. Scott's letter. My information was received from such unquestionable authority that there can be no doubt of its correctness. It is very easy for the committee, whose "sayings and doings" are conducted with so much inquisitorial secrecy, to deny the statement; but they well know that if I were disposed to give up the names of those gentlemen, who, confiding in my honour, made the communication to me, that I could give a complete contradiction to the note signed by their secretary.

I am, Sir,
Yours, obediently,
LONDINENSIS.

London Hospital, Oct. 9, 1833.

WESTMINSTER HOSPITAL.

FRACTURE OF RIBS—EMPHYSEMA—ABSORPTION OF AIR—SECRETION OF AIR.

HENRY WATERS, a stout ruddy carman, thirty-two years old, having drunk too much heavy wet, fell off the shaft of a wagon, which had a load of more than a ton weight, when two of the wheels went over his body, breaking the seventh and eighth, and one or two more, of his left ribs. He was taken to "a surgeon of the first instance,"* and blooded to *twenty* ounces. Thirty leeches were afterwards applied.

He was brought into the hospital on the 25th of July, 1833, at five o'clock p.m., when the thoracic compagines were properly bandaged, and he was put to bed. He had, even after this proceeding, which afforded him relief, considerable anxiety of countenance. The breathing was more laborious than natural, and a râle crepitant was very manifest when the ear was applied to the left side. The bowels had been well opened, and the pulse was 90. A strict antiphlogistic system has been adopted.

Aug. 17. The man was seen to-day by his surgeon, Mr. WHITE, who gave a short history of his case:—"There was a slight wound of the lung," observed Mr. WHITE, "produced by a spicula of one of the broken ribs. This was, of course, attended with some emphysema, which has been removed. Now, Mr. ****," said he, turning to a gentleman who is a constant attendant on the visiting days, "what has become of the air which was in this instance effused in the cellular tissue?" Mr. **** replied, "I suppose it is absorbed, for why should not the lymphatics and veins absorb air, as well as the arteries should secrete it, which is an undoubted fact? You may recollect a case in which I called you in, of a young lady affected with puerperal inflammation of the womb, where, some hours before death, there was eructation of immense quantities of flatus, much greater than could, by any possibility, be produced by the decomposition of the ingesta. We must suppose, in this instance, the absorbent vessels to have some condensing power on the air, by which it is rendered innocuous in the circulation; for, during life, we cannot but consider the texture of the tissues to be wind-tight as well as water-tight, and therefore the air cannot have escaped through the skin." Mr. WHITE, "There is no doubt that collections of air have disappeared from various parts of the system, but we have no evidence to show the mode in which this has been effected. It is probable in this case, that the air has been absorbed, for the reasons assigned by you, but as yet that is a problem, and we can only say with certainty that there it was, and it has now disappeared. I have long been convinced that even in a healthy state, globules of air may exist in the cellular tissue, unaccompanied and unbetrayed by a single symptom." A singular instance of immense secretion of air in the stomach was related by a gentleman present. When we have authenticated the history of the case, by ascertaining the names, it may prove worthy of record.

20. Waters is convalescent, and has nearly recovered his original colour. The broken ribs are united, and he breathes with perfect freedom.

* A general practitioner.—*Bats.*

CORRESPONDENTS.

An Observer at Freemasons Tavern.—Mr. Wakley had no opportunity of supporting such a resolution, as he was not present at the meeting.